History

For nearly 100 years, Meriam has been the leader in the development and manufacture of measurement and calibration solutions. Throughout our history, customers turn to us first because we've established the reputation as the reliable standard in the industry.

Whatever your need, count on Meriam to integrate proven and accurate technologies into all of the products we manufacture.

Whether you prefer the reliability found in our long-standing products such as our Accutube line, or value the convenience in our present day technologies like our smart handheld manometers – Meriam has every product you need to get the job done right.

And as your business expands, Meriam will be ready. We are harnessing newer technologies and developing products that will help your business streamline its costs and reduce downtime, all while maintaining the accuracy you've come to expect from us. Product lines such as Meriam's MFC 4150 HART® Communicator, MFT 4010 Modular Calibrator and our industry-leading wireless instrumentation have put us on the map for innovative products and dependable service for years to come.

So, next time your project calls for superior measurement and calibration products, consider Meriam to be your supplier. Our products and knowledgeable customer service staff will ensure we keep you on time and on budget.

Precision products. Precisely Meriam.

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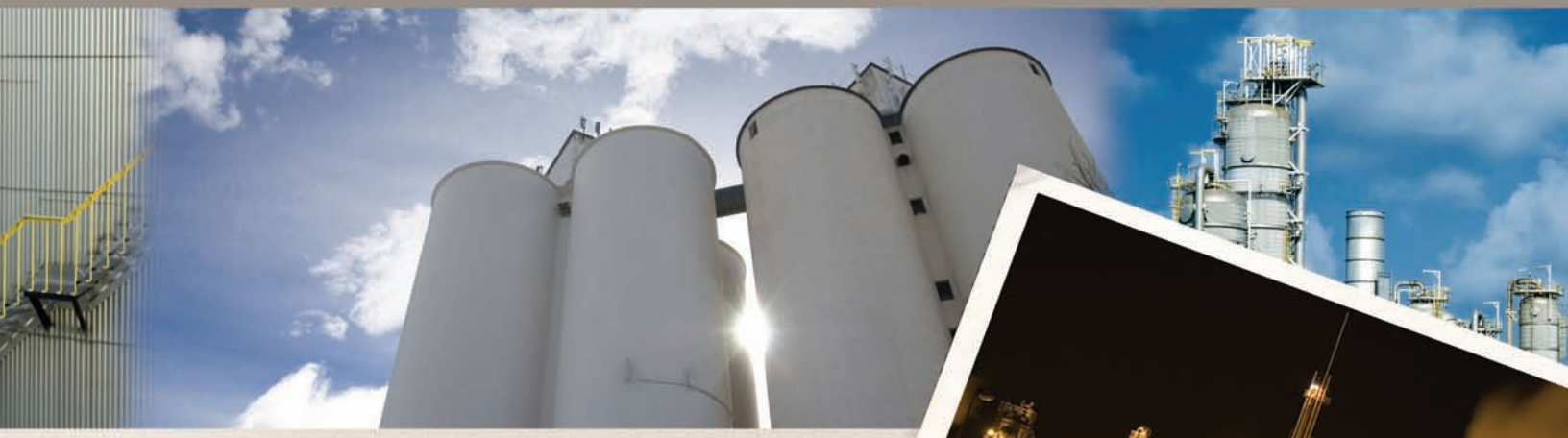

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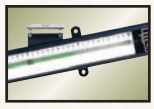

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Device Management Solutions

Meriam is the industry leader with its line of device management solutions. Whether you choose our MFC 4150 Hart® Communicator unit, or seek additional features with our MFT 4010 Hart Calibrator units, you can rest assured knowing that our compact, handheld units provide ease of use and rugged reliability.

PICTURE. PERFECT. PRECISION.

Meriam is recognized as a world class supplier of innovative instrumentation that is accurate, reliable, cost effective, rugged and easy to use. With nearly 100 years of expertise, Meriam offers problem-solving capabilities and the personal attention to customers that sets us apart. In-house technical support, published primers, selector guides, how-to manuals and application notes are all readily available to help you solve your measurement and calibration problems

MFC 4150

The MFC 4150 Series HART Communicator is the latest from Meriam Process Technologies and supports Universal, Common Practice and Device Specific commands. The MFC is designed for the life cycle of your plant process devices: commissioning, configuration and maintenance operations. HART field devices can be configured, polled and trimmed using the MFC. The MFC 4150 is a general purpose version for use in non-hazardous environments. The MFC 4150X is ATEX certified Ⓔx II 1 G, EEx ia IIC T4, Class I, Div. 1 Groups A, B, C, D: T4 for use in potentially hazardous environments.

This HART Communicator is designed for optimum convenience and usability. The MFC 4150 and 4150X never need to leave your hands for updates. New operating firmware and device profiles are downloaded via the Internet, saving time and increasing availability.

MFT 4010

MFT 4010 is the instrument of choice for technicians in every industry. The MFT 4010 delivers the versatility of a modular calibrator and the convenience of HART communications in one handheld unit.

Our MFT 4010 combines the convenience of three module bays for a variety of pressure, temperature and electrical measures and simulate modules with integral voltage and current meter. With HART communications and documentation capability, this is the one tool that can replace several in the field.

Modules

Meriam offers sensor module options that cover a wide range of pressure, temperature, voltage and current measurement requirements.

- Pressure modules measure differential, gauge and absolute pressure
- VMA0055 – DC Voltage/Current Measurement and Simulation Module
- TIO0110 – Thermocouple Measurement and Simulation Module
- RIO4000 – RTD Measure and Simulation Module for MFT 4010

DMS

Device Management System (DMS) is a Microsoft SQL based software package that manages all aspects associated with the life cycle of devices in your plant.

The DMS takes an integrated approach to configuration and calibration management with its seamless interface to Meriam's documenting calibrator and communicator, the MFT 4010 series, and MFC 4150 for commissioning and configuration.

Scalable and flexible to accommodate any size operation.

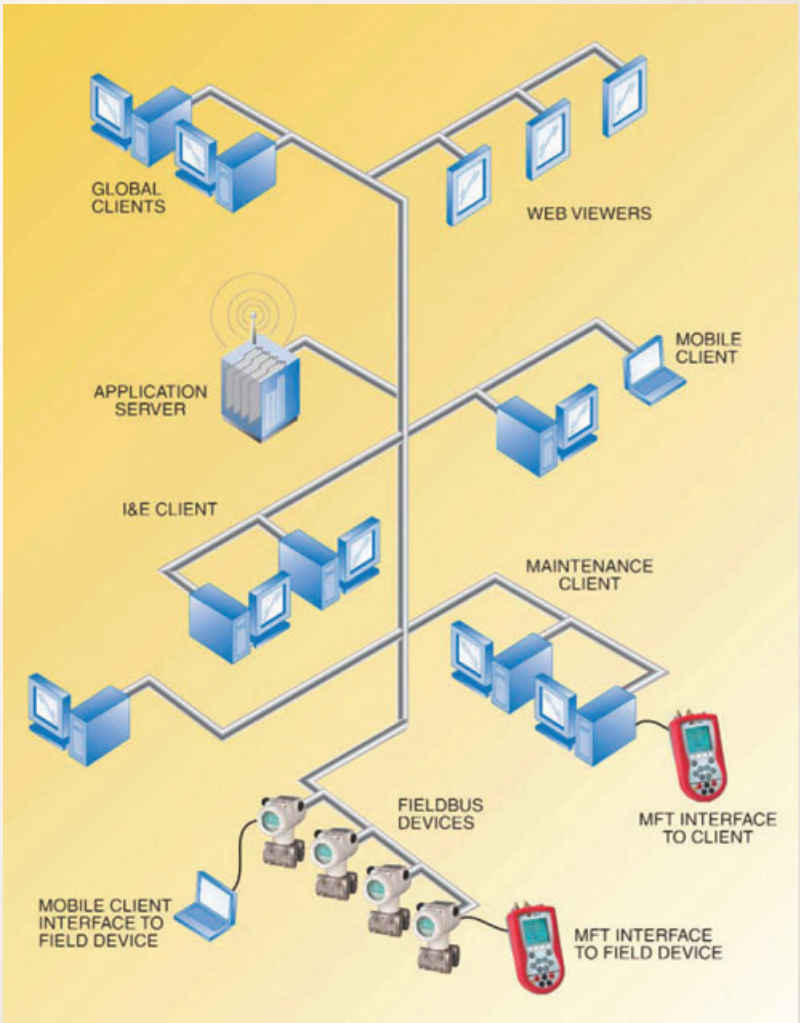
DMS is designed for easy scalability, in terms of clients and devices. Functionality is limited by user group definitions and permissives, so that only authorized personnel make changes to devices.

The DMS base software is a full featured calibration and configuration management tool and supports HART® Fieldbus Technology. Software modules extend the feature set to include major functionality such as online features to support connectivity to device networks.

New device model releases and revisions are maintained on our web site. These device model library additions and DMS software service packs are available from our download web site.

New devices can be configured and installed by cloning similar existing devices. The source for cloned devices exists as an off-the-shelf device or a device modeled in the DMS database. With DMS, you are able to clone an entire system and use it as a baseline for developing a similar system for a new division, streamlining plant expansion and Greenfield projects. DMS is the complete device management solution for the life cycle of your process plant.

Device Management System



MFC 4150 HART® Communicator

The MFC 4150 HART® Communicator is the latest HART communicator from Meriam Process Technologies. HART field devices can be configured and trimmed using the MFC. The MFC is a full function HART Communicator with time-saving features that optimize commissioning, configuration and maintenance operations.

MFC 4150 supports all HART devices at the Universal and Common Practice command levels plus a large and growing list of devices at the Device Specific command level. View our field device list by going to **www.meriam.com** and selecting Resources / Download Center / Available DOFs.

WE'VE GOT HART COMMUNICATION PROTOCOL ABILITY

MFC 4150 shown with dongle (standard accessory)

MFC 4150 Advantages

The MFC offers several unique features that provide HART users with a more useful, more reliable and more available communication tool. Just consider the MFC 4150's features:

- Quick start up and connect: 15 seconds!
- 60 hours battery life (w/o backlight)
- 28 hours battery life with backlight
- Update new device profiles and firmware from Meriam via the Internet – the MFC 4150 is never out of your hands
- Clone / Upload / Download configurations
- Off-line mode for editing / reviewing configurations
- Document and store 200 configurations
- 13-line, 128 x 128 graphic, backlit display
- Dongle coordinates AC power adapter and serial communications
- Full alpha-numeric keypad
- Review / Edit on the fly
- Quick Menu short cuts for commonly used commands
- HART menu Home key
- Dedicated text edit keys
- Programmable lock-out settings
- Contrast key for direct adjustment in any mode
- Elastic hand strap, adjustable shoulder strap and soft carrying case
- Left side thumb keys for one-handed navigation

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M4 SERIES

MFC 4150

HART® Communicator

Ordering Information

Model Numbers

- MFC 4150 — CE, General Purpose
- MFC 4150X — CE, ATEX I.S., $_{c}UL_{us}$

Standard Accessories

- Z4150-7R — Protective red boot
- Z4150-13 — Soft carrying case with shoulder strap
- Z4150-10A — Dongle for communications and AC adapter
- 9B00007 — Universal AC adapter
- A907447-00052 — DB-9 cable, Male x Female 6ft length; required for updates / communication

Industry Applications

Common Applications

Commission devices
- Step-by-step configuration
- Document as-left configuration

Operations
- Reconfiguration for process changes
- Reconfiguration for batch runs
- Document as-found and as-left configurations
- Populate DMS database (see companion products below)

Device Maintenance
- Troubleshoot devices with HART
- View device error messages
- Clone devices to commission replacements

Features

Standard Features Included

- Standard Documenting; Refer To DMS Software Datasheet
- HART® lead kit
- Protective Rubber Boot
- RS-232 Serial Cable
- Power adapter 120 to 240 VAC, 50 – 60 Hz and Universal Plug Adapter Kit
- AA alkaline batteries (6 each)
- Hard copy user's manual
- DPC Manager Utility for updating MFC
- CE for EMC testing (all models)
- Intrinsically Safe (MFC 4150X only) ATEX certification by DEMKO

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Companion Products

Combine the MFC 4150 with our MFT 4010 Calibrator / Communicator and Device Management System (DMS) software and the trio offers the only single-source device management solution capable of meeting all aspects of device management.

Device Management System (DMS)

Full calibration and configuration management database. Featuring secure device history, report generation and search functions. Use with MFT / MFC.

MFT 4010 Multifunction Calibrator / HART Communicator

Three module bays, documenting from stored or manual procedures, full HART communications support for analytic, flow, level, pressure temperature and valve type devices.

Specifications	
Base Unit	10⅜"L x 4¼" to 2½"W x 1¼" to 1⅞"D; ABS plastic case, 1.7 lbs. (w/batts.)
Keypad	Membrane keypad: 4 soft, 8 single function, 30 dual function, 3 thumb
Display	13 line, 128 x 128 pixel graphic display, 2.1" x 2.1" viewable area, backlight
Power	Six AA alkaline or NIMH batteries; or 100-240 VAC power adapter Use only approved alkaline batteries for MFC 4150X units
Connections	Standard banana jacks (¾" center) for HART®, Odu connector for dongle. Dongle coordinates AC adapter power and DB-9 serial communications.
4150 Certifications	CE EMC testing as battery powered, portable
4150X Certifications	Intrinsically safe (approved AA alkaline batteries only) Ex II 1 G; EEx ia IIC T4 Intrinsically safe, Exia Class I, Div. 1 Groups A, B, C, D: T4 -5ºC<Ta<+50ºC
Temperature Specifications	Storage: -40°F to 140°F (-40°C to 60°C) Operating: 23°F to 122°F (-5°C to 50°C)

MFT 4010 with RTD module and PT100 probe

Modules interchangeable in 3 bay locators

HART® COMMUNICATION PROTOCOL

MFT 4010 Modular Calibrator

with HART® Communication Option

The MFT 4010 is a break-through combination calibrator / HART communicator that truly reduces the time spent on field calibrations. The MFT 4010 Series delivers the versatility of a calibrator and the convenience of HART communications in one handheld unit. Users can view up to four measurements simultaneously on the high resolution LCD or compare HART PV and AO values to corresponding values measured by the NIST traceable MFT. Available modules include differential, gauge, vacuum and absolute pressure as well as temperature and voltage/current. A voltage and current meter is integral to the base unit. All HART field devices can be configured, polled and trimmed using HART communications. Device Specific commands for supported devices are included with the MFT.

MFT 4010 Advantages

All-In-One Tool – takes the place of multiple handheld instruments, simplifies workload and improves productivity.

Automation for HART field devices – calibration is automated through auto setup of the calibrator based on the device settings; digital trims automate the device adjustment steps.

Calibration Types Supported – pressure, t/c, RTD, I/P, P/I, Switch, Loop and mA/V for conventional HART transmitter or local indicators.

Document As found and As left Calibration Results – Create calibration procedures on the handheld or download them from compatible device management software. Save results to non-volatile memory.

Field Updates – uses Internet downloads to update and add capability / HART support.

Modules – select from a variety of positive-lock measurement modules for excellent versatility.

Field Recertification – sensor modules and integral V/I can be recalibrated for zero, span and linearity via the MFT.

User Interface – 2.1" x 2.1" display, four soft keys (definitions change with mode requirements) and eight hard keys provide user interface. Display is configurable for 1 to 4 simultaneous measurements.

User Convenience – Auto shut off, Damping, Min/Max value capture, display Hold, sensor Zero, direct Contrast adjustment.

Security Lockout – Lockout specific MFT settings or all at one time.

Diagnostics – MFT 4010 self-tests upon power up and upon installation of sensor modules. Advisories are posted on the display.

Dedicated DOF Memory – memory for 500 HART device drivers.

Measurement Units – customary English and Metric System units are selectable.

Hard carrying case shown.
Soft case also available.

MFT 4010

Modular Calibrator with HART® Communication Option

Ordering Information

Model Numbers

- MFT 4000-11-1-00 CE
- MFT 4000-11-1-01 CE & IS
- MFT 4005-11-1-00 HART P/T Trans., CE
- MFT 4005-11-1-01 HART P/T Trans., CE, IS
- MFT 4010-11-1-00 HART, CE
- MFT 4010-11-1-01 HART, CE, IS

Standard Accessories

- 3 Blank inserts for open sensor bays
- AC Power adapter, 100 - 240 VAC for US plug, International plug kit
- HART® lead kit with 250 ohm shunt adaptor for HART communication (MFT 4010)
- Test lead kit
- RS-233 Serial communications cable
- Hard copy user's manual
- Protective rubber boot

Optional Accessories

- Pressure Modules (See page 10-11)
- RIO4000 RIO Module
- TIO4000 TIO Module
- VMA0055 VMA Module
- Soft carrying case with shoulder strap carries base unit, modules, pump, lead kits and fittings/tubing
- Hard carrying case with handle – foam insert for base unit with 3 installed modules/fittings, 4 additional modules, lead kits, hand pump, RTD probe, fittings
- Kits – Consult factory for details

Supported Calibrations

- Pressure gauges, transmitters, switches
- Temperature gauges, transmitters, switches
- Level (hydrostatic)
- P/I, I/P, P/P converters
- Loop simulations
- Much more!

Models & Options

MFT 4000 Calibrator
Base unit for calibration work with selected NIST traceable sensor modules & integral voltage/current meter.

MFT 4005 Calibrator with HART® Trims
MFT 4000 with HART support limited to analog and digital trims for calibration support.

MFT 4010 Calibrator with HART®
Base unit for modules and full Device Specific HART communications. Quick Cal displays HART PV and AO along with MFT's NIST traceable measurements. User can identify needed trim(s) and access the trim function(s) from same display. Smart Trim allows selection of analog or digital trims without navigating through menu trees.

Documenting
Documenting memory and firmware for use with Meriam DMS software. Stores up to 200 HART configuration files and over 100 calibration results (as-found & as-left data [up to 21 points each], time/date info, tag). Communicate with PC via DB-9 connector.

Companion Products

Device Management System (DMS)

Full calibration and configuration management database. Featuring secure device history, report generation and search functions.

MFC 4150 HART Communicator

The most reliable, most useful and fastest connecting HART communicator available.

Specifications

Base Unit	9.00"L x 4.70"W x 3.58"D ABS plastic case with shock absorbing boot, 28 ozs, three bays for measurement modules
Keypad	Overlay keypad with 10 dome contact style buttons and 4 soft keys. Alpha entry based on LCD alpha matrix; numeric entry with buttons.
Display	128 x 128 pixel graphic display, 2.1" x 2.1" viewable area, 5-digit resolution
Power	6 AA alkaline or NiMH batteries; Optional 100 – 240 VAC power adapter
Connections	Standard banana jacks (¾" center) for ±50 mA/Volts and for HART
Data Transfer	DB-9 for RS-232C
Certifications	CE Approval. Intrinsically Safe, Class I, Div I areas per CSA 22.2 & UL 913 by MET Laboratories
Temperature Specifications	Storage: -40°F to 140°F (-40°C to 60°C) Operating: 23°F to 122°F (-5°C to 50°C)
NIST Traceable Accuracy	Current / Voltage: ± 0.025% of F.S. ± 0.001% of Span per °F (ref. temp. 70°F). (see Modules for accuracy)
Modules	2.3"L x 1.3"W x 2.6"D, 8.3 ozs or less. Positive-lock with spring latch. Depress latch to release. Electrical connections are PC board contacts to receivers on base unit. Blank inserts protect any empty bay(s).

Pressure Modules

for use with MFT 4000, MFT 4005 and MFT 4010

Pressure Sensor Modules from Meriam Process Technologies are available in a several types and ranges to provide the ultimate in flexibility and convenience for portable calibration standards. Meriam pressure modules are used with any MFT 4000 Series Multi-Function Tester by installing modules into any of three (3) MFT sensor bays. The modules are completely interchangeable to facilitate most pressure testing needs (restrictions on module installation and removal apply to Intrinsically Safe MFT units).

NIST traceable accuracy of ± 0.025% FS is available for most pressure ranges and types. This accuracy statement includes all effects of linearity, hysteresis, repeatability and temperature from 23°F to 122°F (no partial temperature compensation here!). A NIST certificate and calibration data are included with each module for quality assurance purposes.

Pressure Measurement Module Advantages

Calibration coefficients for all modules are stored in non-volatile sensor module memory. This means any pressure module can be used in any Meriam MFT without manual programming of coefficients. When a module is installed and the MFT is powered up, the MFT senses the module bay connection, polls the module for the calibration coefficients and configures the display for pressure readout in the last engineering unit selected. Engineering units, including PSI, centimeters or inches of H_2O (at 4°C, 20°C, or 60°F), kg/cm^2, kPa, mBars, Bars, millimeters, inches of Hg (at 0°C ref. temp) and oz/in^2 are all selectable from the MFT keypad.

Meriam sensor modules are designed to be re-calibrated in the field with appropriate local calibration standards. The MFT's Rcal feature allows customers to adjust zero (offset) and full scale (gain) plus up to seven (7) addition points on the calibration curve. Dead weight testers are generally used to apply a known pressure to a module. The Rcal feature allows the user to key in the applied pressure value, which lets the module know how to correct its calibration curve. Meriam also provides factory re-calibration services for pressure modules including complete documentation and certification.

Pressure Modules

for use with MFT 4000, MFT 4005, and MFT 4010

Ordering Information

Pressure Modules: See Accuracy Table for Model Numbers

Accessories

ZB34686 961P pressure pump with integral variator, bleed valve, ⅛" FNPT connection, 0 - 145 PSIG

ZB34700 961V vacuum pump with integral variator, bleed valve, ⅛" FNPT connection, vacuum 0-650 mm Hg

ZA34386 Low Pressure Connector Kit (not for use above 250 PSIG)

ZA34102 ⅛" O.D. tubing to ⅛" MNPT connector (not for use above 250 PSIG)

ZA34112 ⅛" O.D. tubing union tee (not for use above 250 PSIG)

ZA34099-1 ¼" MNPT x ⅛" FNPT reducer bushing, brass

ZA34103-2 10 ft. of ⅛" O.D. nylon tubing (not for use above 250 PSIG)

ZA36853 Push to read equalizing manifold for DP modules, brass, ⅛" FNPT connections

ZA900020-90502 High Pressure Connection Kit, 3' hose (not for use above 9,000 PSIG)

ZA900020-90503 High Pressure Connection Kit, 1' hose (not for use above 9,000 PSIG)

ZA900020-90501 5 pcs 1/4" MNPT x HP Quick Connect Fitting (not for use above 9,000 PSIG)

ZA900436-00001 1 pcs ⅛" MNPT x HP Quick Connect fitting (not for use above 9,000 PSIG)

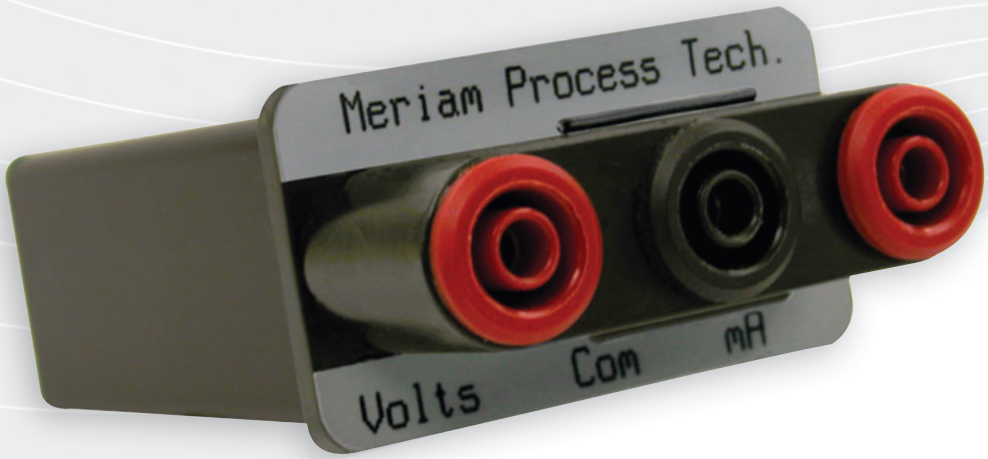
Available Pressure Modules

Accuracy	Model	Pressure Range	Accuracy	Type
±.10% *	FDN0010	0-10" H_2O	± 0.01" H_2O dp	Differential
	FDN0020	0-20" H_2O	± 0.020" H_2O dp	Differential
±.025% *	DDN0100	0-100" H_2O	± 0.025" H_2O dp	Differential
	DDN0200	0-200" H_2O	± 0.05" H_2O dp	Differential
	DDN0400	0-400" H_2O	± 0.10" H_2O dp	Differential
	DDN2000	0-2000" H_2O	± 0.50" H_2O dp	Differential
	DGI0020	0-20 PSIG	± 0.005 PSIG	Gauge
	DGI0200	0-200 PSIG	± 0.05 PSIG	Gauge
	DGI0500	0-500 PSIG	± 0.125 PSIG	Gauge
	DGI1000	0-1000 PSIG	± 0.25 PSIG	Gauge
	DGI1500	0-1500 PSIG	± 0.375 PSIG	Gauge
	DGI2000	0-2000 PSIG	± 0.500 PSIG	Gauge
	DAI2000	0-2000 mm Hg	± 0.50 mmHg Abs	Absolute
	DAI0900	0-900 mm Hg	± 0.225 mmHg Abs	Absolute
	DAI5200	0-100 PSIA	± 1.30 mmHg Abs	Absolute
±.05% *	GGI3000	0-3000 PSIG	± 1.50 PSIG	Gauge

**** Includes all effects of linearity, hysteresis, repeatability and temperature from 23°F to 122°F***

Specifications

Temperature Specifications	Storage: -40°F to 140°F (-40°C to 60°C) Operating: 23°F to 122°F (-5°C to 50°C)
Model codes and uses	xDN: Differential Non-isolated – clean, dry, non-corrosive gases only xGI: Gauge Isolated – medias compatible with 316SS xAI: Absolute Isolated – medias compatible with 316SS
NIST Traceable Accuracy	See specification in Table above
Connections	⅛" FNPT, 316SS
Pressure Limits	xGI / xAI modules: 2X range / 316SS compatible xDN modules: 2X range when pressurized on high side only, 150 PSI when applied simultaneously to high and low sides
Certifications	CE Mark (standard) NIST traceability certificate (standard) Intrinsically Safe, MET Laboratories per CSA C22.2 & UL Class I Division I (standard on all pressure modules)



VMA0055

DC Voltage/Current Measurement and Simulation Module

The VMA0055 is a DC voltage and current measurement and simulation module for use with the Meriam MFT 4000 Series Multi-Function Tester. The module features the functionality of a DVM and loop calibrator for convenient field versatility. When used with other MFT functions, the VMA / MFT combination provides valuable functionality not available in other devices. Measurement ranges include ±500 mV, ±55 V, and ±100 mA. Sourcing capabilities include ±1000 mV, 0 – 24 V and 0 – 22 mA. The VMA module will also simulate transmitter outputs when connected to a loop or it can be used to temporarily supply 24V DC loop power to unpowered devices during commissioning or calibration activities.

VMA0055 Advantages

VMA0055 goes far beyond the ±50 volts / mA measurement capability of the MFT base unit and has its own isolated power supply so common ground problems are not an issue. Consider the following advantages for MFT users:

Power a transmitter directly from VMA
- Use MFT 4000, 4005 & 4010 to calibrate transmitters anywhere, anytime
- Concurrently use MFT base unit to check transmitter input (P, T, V, i) and output
- Use MFT 4010 HART® communications to commission or reconfigure unpowered transmitters

Measure mV, V or mA as you would with a DVM
- Reduce the number of tools the technician carries
- Resolution to 1/100,000 counts
- Select desired V range for best possible accuracy

Source precise voltage or mA signals to check calibration or operation of receiving devices or step a valve positioner
- Key in exact output value desired
- Increase or Decrease output value by predefined increments
- Auto-step tests are user defined for start and stop values, number of steps, dwell time, and manual or automatic advance

Read volts or mA from MFT meter while sourcing volts or mA from VMA module
- Test input isolation buffers with one MFT; apply mA value to buffer input with VMA and measure mA value output of buffer
- Select mA or V measurement on MFT meter from the VMA output display without interruption of output

Simulate transmitter output in externally powered loop
- VMA modulates loop current to any selected value
- Increase or Decrease simulated value by predefined increments
- Auto-step tests are user defined for start and stop values, number of steps, dwell time, and manual or automatic advance

I/P Device and Switch testing
- Combined with a pressure module, perform I/P testing
- Use VMA power source to wet switch contacts and use pressure and temperature modules for pressure and temperature switch testing

Available certifications include:
- CE Mark; NIST traceable – standard
- Intrinsically Safe – MET Laboratories per CSA C22.2 & UL 913 Class I Division I, Groups A, B, C & D

VMA0055

DC Voltage/Current Measurement and Simulation Module

Resolution, Range, and Accuracy Specification for VMA0055 Module

Ambient temperature limits: -10°C to +50°C
Accuracy statements are for ambient temperatures of 18°C to 28°C.
Apply the Temperature Coefficient for ambient temperatures below 18°C and above 28°C

DC Current (mA) Measure and Source Modes

Specifications	Measure Mode	Source Mode (No External Power)
Resolution	.001 mA	.001 mA
Range	±100.000 mA (55 VDC compliance)	0 - 22.000 mA (See Note 3 below)
Accuracy	± (0.01% of reading + 0.015% FS)	± (0.01% of reading + 0.015% FS)
Open Circuit Voltage		24 VDC
Output Drive		15 VDC minimum @ 24 mA, Resistive load
Temperature Coefficient	± (0.001% Rdg +0.002% FS) / °C	± (0.003% Rdg +0.003% FS) / °C

Volts DC Measure and Source Modes

Specifications	Measure Mode	Source Mode (No External Power)
Resolution	1/100,000 counts: .001 mV; .001 V	1/100,000
Range	±500 mV; ±1, 2, 4, 8, 15, 30, 55 V	0 - 24.000 VDC
Accuracy	± (0.025% of reading + 0.005% FS)	± (0.01% of reading + 0.05% FS)
Open Circuit Voltage		24 VDC
Output Drive		15 VDC minimum @ 24 mA, Resistive load
Temperature Coefficient	± (0.001% Rdg +0.0015% FS) / °C	± (0.0025% Rdg +0.0035% FS) / °C

Ordering Information

Model Numbers

VMA0055-11-1 VMA Module

Accessories

ZA900529-00015 VMA Test Lead Kit: banana plugs on 9" breakouts (both ends), assorted connectors (recommended for source and simulate functions)

Notes

1. Nominal resistance at VMA current terminal is 10 – 15 Ω

2. Output load line is linear

3. Unit operating time de-rated at high temp and high current as follows:
- Continuous operation @ 50ºC and 20mA
- 15 minutes typical @ 50ºC and 24mA (unit will shut down to prevent thermal damage)

2-Wire Transmitter Simulation Mode

Specifications	Simulation (External Power)
Resolution	.001 mA
Range	0 – 24.000 mA
Accuracy	± (0.01% of reading + 0.015% FS)
Loop Voltage Limits	1 VDC min., 55 VDC max.
Temperature Coefficient	± (0.003% Rdg +0.003% FS) / °C

Loop Power Mode

Specifications	Regulated Power Source
Range	24 VDC
Open Circuit Voltage	24 VDC
Output Drive	15 VDC Min. @ 24mA, Resistive load

TIO0110

Thermocouple Measurement and Simulation Module

The TIO0110 is a thermocouple (T/C) measurement and simulation module for use with the Meriam MFT 4000 Series Multi-Function Tester. The module will accurately measure or source ±110 milli-Volts (mV) for any of twelve (12) different T/C types according to NIST 175, ITS-90 (default) or ITS-68 standards. In the measure mode, the TIO0110 module converts mV dc to a temperature value in the user-selected temperature unit (°F, °C, °R or °K) and per the selected standard. Milli-volts can also be displayed for direct reading or trouble shooting needs.

In the simulate mode, the TIO0110 module simulates an accurate mV signal to a receiving device. Users can enter the precise simulation temperature value, change the value with convenient controls on the MFT, or set-up and select from three Auto-Step or three Auto Ramp test procedures per T/C type. Test points are determined by the user and can be stepped through automatically or manually as desired. See T/C Table 1 below for available T/C types and measurement / simulation accuracy.

T/C calibration coefficients are factory loaded into module memory for instant access by the base MFT. Field recalibration of the module is possible using the MFT's "Rcal" feature (appropriate calibration standards are required).

Table 1: TIO0110 Accuracy Table

T/C Type	Measurement Range	Measurement Accuracy	Simulation Accuracy
J	-210ºC to 1200ºC	±0.3ºC	±0.5ºC
K	-200ºC to 1372ºC	±0.5ºC	±0.5ºC
T	-200ºC to 400ºC	±0.3ºC	±0.5ºC
E	-200ºC to 1000ºC	±0.3ºC	±0.5ºC
N	-200ºC to 1300ºC	±0.3ºC	±0.5ºC
R	-50ºC to 1768ºC	±1.0ºC	±1.0ºC

T/C Type	Measurement Range	Measurement Accuracy	Simulation Accuracy
S	0ºC to 1768ºC	±1.0ºC	±1.0ºC
B	250ºC to 1820ºC	±1.0ºC	±1.0ºC
C	0ºC to 2315ºC	±0.5ºC	±0.5ºC
D	0ºC to 2315ºC	±0.5ºC	±0.5ºC
M	0ºC to 1410ºC	±0.5ºC	±0.5ºC
P	0ºC to 1395ºC	±0.5ºC	±0.5ºC

TIO0110

Thermocouple Measurement and Simulation Module

MFT 4010 with TIO 0110 module
simulate T/C input to transmitter

MFT display for T/C Simulate mode

TC Simulation			
Simulation Mode			
Start			
Units: C			
Step Value: 25 C			
→ Auto Step 1			
Auto Step 2			
Auto Step 3			
Auto Ramp 1			
Auto Ramp 2			
Auto Ramp 3			
Up	Down	Select	Back

MFT 4010 with TIO 0110 Module
T/C measure and simulate module

MFT display for T/C Setup mode

TC Setup			
Current Settings			
→ TC Type	J		
Standard	ITS 90		
Resolution	0.1 deg		
Simulate Mode			
User Re-Calibrate			
Up	Down	Select	Back

Ordering Information

TI00110-11-1 T/C Measure / Simulate Module

Accessories

ZA37062 TIO 0110 Starter Kit (Includes t/c wire kits for types E, J, K, N, T, BK and R/S plus mV cable.)

Specifications	
Input Impedance	> 10 megohms
Warm-up time	≤ 1 Minute to full rated accuracy
mV Accuracy	± 0.025% R + 0.005% FS
Temperature Effect	≤ 2uV/°C
T/C Meas. Accuracy	± 0.3°C for E, J, K, N, & T types
T/C Meas. Accuracy	± 1.0°C for B, R & S types
T/C Meas. Accuracy	±0.5°C for C, D, M & P types
Connector	- Measure: standard mini-T/C connector - Source: standard mini-T/C connector
Temperature	Storage: -40°F to 140°F (-40°C to 60°C) Operating: 23°F to 122°F (-5°C to 50°C)
Cold junction effect	± 0.5°C max
Resolution	± 0.1° or ± 1° for T/Cs, ± 0.001 for mV
Voltage range	± 110.000 mV dc
Units	°F, °C, °R, °K, mV
Weight	3 ozs
Power	Supplied from MFT (simulate mode only)
Available certifications	NIST traceable mV functions – standard Intrinsically Safe – MET Laboratories per CSA C22.2 & UL 913 Class I Division I, Groups A, B, C & D

RIO4000

RTD Measure and Simulate Module for Meriam MFT 4000

The RIO4000 is the RTD measure and simulate module for the Meriam MFT 4000 Series Multi-Function Tester. The module accurately measures or simulates the resistance of 22 different RTD sensor types with nominal resistance to 4000 ohms. 2-, 3-, and 4-wire RTDs are supported for various RTD types; platinum, copper, nickel or iron. Common alpha coefficients are supported per Table 1. The module can simulate temperature to all conventional or smart temperature transmitters and signal conditioners.

The MFT converts measured resistance to a corresponding temperature value and displays the value in the user-selected temperature unit (°F, °C, °R or °K). Ohms can also be displayed for direct reading or troubleshooting. Pt 100 RTD probes are available from Meriam for use with the module. The Meriam RTD probes are 4-wire, DIN Class A probes, which come complete with handle, 5' coiled cable and connector. Accessory connectors are available to connect to any RTD or temperature transmitter for measurement or simulation applications. The RTD Simulation mode can be setup by entering a specific temperature or a range of temperatures for stepping and ramping functions.

Table 1: Supported RTD Materials / Nominal Resistance

Material	R0	ALPHA	Rs(ID)	Temp Range
Platinum	25.5	0.00392	17.8	-200°C to +630°C
Platinum	98.129	0.00392	21.5	-200°C to +600°C
Platinum	100	0.00385	100	-200°C to +850°C
Platinum	100	0.00392	46.4	-200°C to +630° C
Platinum	100	0.00391	56.2	-200°C to +630°C
Platinum	100	0.00393	68.1	-200°C to +850°C
Platinum	100	0.00389	82.5	-200°C to +630°C
Platinum	200	0.00385	178	-200°C to +630°C
Platinum	200	0.00392	215	-200°C to +630°C
Platinum	470	0.00392	261	-200°C to +630°C
Platinum	500	0.00392	316	-200°C to +630°C

Material	R0	ALPHA	Rs(ID)	Temp Range
Platinum	500	0.00391	383	-200°C to +630°C
Platinum	500	0.00385	464	-200°C to +630°C
Platinum	1000	0.00385	1000	-200°C to +630°C
Platinum	1000	0.00375	1210	-50°C to +500°C
Copper	9.035	0.00427	12.1	-100°C to +260°C
Copper	100	0.00427	121	-100°C to +260°C
Nickel	100	0.00618	31.6	-60°C to +160°C
Nickel	120	0.00672	147	-80°C to +260°C
Iron	604	0.00518	562	-100°C to +200°C
Iron	908.4	0.00527	681	-100°C to +200°C
Iron	1816.81	0.00527	1470	-100°C to +200°C

The table above lists the RTDs supported by the RIO4000 module and MFT 4000 Series. Materials, types and alpha coefficients are based on popular RTDs used in the field.

Meriam offers Pt 100 accessory probes that are automatically recognized by the RIO4000 module. No set up is necessary on the MFT. Users can configure their own reference RTDs similarly by using the accessory connector and Rs resistor (Probe ID resistor listed in the table above) to connect their RTD. This technique allows the module to automatically recognize the connected RTD and load its characteristics. If no Rs resistor is used, a copper wire must be installed in its place. This causes an RTD selection menu to automatically appear on the MFT display, enabling the user to configure the MFT for use with any supported RTD type.

RIO4000

RTD Measure & Simulate Module for MFT 4000

Table 2: RIO4000 Accuracy Table

RTD Type	(α)	Operating Temperature 18ºC < T < 28°C* T Range (°C)	Measure (2, 3, 4 wire)	Simulate (2 wire**)
Pt 100	385	-200 to 0	0.3	0.3
		0 to 400	0.4	0.4
		400 to 850	0.5	0.6
Pt 100	389, 391	-200 to 0	0.3	0.4
		0 to 360	0.4	0.6
Pt 100	392	-200 to 0	0.4	0.4
		0 to 360	0.5	0.6
Pt 100	393	-200 to 0	0.5	0.4
		0 to 400	0.4	0.5
		400 to 850	0.6	0.6
Pt 200	385, 392	-200 to 0	0.2	0.4
		0 to 400	0.6	0.5
		400 to 630	0.8	0.6
Pt 500	385, 392	-200 to 0	0.2	0.4
		0 to 400	0.3	0.5
		400 to 630	0.4	0.6

Ambient temperature limits: -10ºC to +50ºC
Accuracy statements are for ambient temperatures of 18ºC to 28ºC.
Apply the Temperature Coefficient for ambient temperatures below 18ºC and above 28ºC
*Temperature Coefficient = 0.02 ºC / ºC
** For Simulation, Manufacturer's 2 Wire Simulation Cable is required.

RTD Type	(α)	Operating Temperature 18ºC < T < 28°C* T Range (°C)	Measure (2, 3, 4 wire)	Simulate (2 wire**)
Pt 500	391	-200 to 0	0.2	0.4
		0 to 400	0.4	0.5
		400 to 630	0.5	0.6
Pt 1000	385	-200 to 0	0.2	0.4
		0 to 400	0.3	0.5
		400 to 630	0.4	0.6
Pt 1000	375	-50 to 0	0.3	0.4
		0 to 500	0.3	0.5
Cu 10	4274	-100 to 0	2	2
		0 to 260	2	2
Cu 100	4274	-100 to 0	1	1
		0 to 260	1	1
Ni 100	618	-60 to 160	0.2	0.4
Ni 120	672	-80 to 260	0.2	0.4
Fe 604	518	-100 to 200	0.3	0.5
Fe 908	527	-100 to 200	0.3	0.5
Fe 1816	527	-100 to 200	0.2	0.5

Note: Simulation Accuracies hold true on Pulsed Type Transmitters when they are placed in "Active Calibration" mode, or a similar continuous mode. Consult temperature transmitter manual or factory for more detail.

Ordering Information

RIO4000-11-1	RTD Measure/Simulate Module

Accessories

ZA900028-90200	Connector solders to a customer's RTD wiring to facilitate connection to the RIO4000 module
ZA900028-90201	Pt 100 RTD, DIN Class "A", 0.00385 alpha, 4 leads, ¼" O.D., 304SS probe, 10" probe length, 3.5" handle and 5 ft coiled cable with connector for RIO4000 module.
ZA900028-90500	Measure Cable to connect the RIO4000 module to RTD wires or transmitter terminals. Used for Measure Mode only. (Do not use for Simulation Mode) (Rs= 0.0 Ohms)
ZA900028-90502	2-Wire simulation cable. (Rs = 7.5 Ohms)
ZA37063	RTD Starter Kit; includes A900028-90200/-90500/-90502

Specifications	
0-400 Ω Measurement Accuracy	±0.01% of R + 0.075 Ω
0-400 Ω Simulation Accuracy	See Table 2 Pulsed excitation current support
400-4000 Ω Measurement Accuracy	±0.01% of R + 0.237Ω
400-4000 Ω Simulation Accuracy	See Table 2 Pulsed excitation current support
Resistance Range	0 – 4000 ohms
Input impedance	> 10 megohms
Mating Connector	Switchcraft #TA6FL
Units	°F, °C, °R, °K, ohms
Temperature	Effect: ≤ 0.001 ohm/ ºC Storage: -40°F to 140°F (-40°C to 60°C) Operating: 14°F to 122°F (-10°C to 50°C)
Resolution	± 0.1° or ± 1° for RTDs
Weight	3 ozs.
Certifications Available	CE Mark (standard) NIST traceability certificate (standard) Intrinsically Safe, MET Laboratories per CSA C22.2 & UL Class I Division I (standard)

DMS Software shown on PC (not included)

DMS

The Complete Calibration & Configuration Management Solution

Configuration Management

Meriam is the only single source manufacturer of calibrator, communicator and software that uses the same base technology for documenting changes to device configuration parameters. Smart field devices have parameters and values that make up the device configuration. Configuration changes can be made by direct communications from DMS to the Device via HART Modem, from the MFC (HART Communicator), or the MFT (Calibrator/Communicator). The integration of DMS with the MFT and MFC provide an advanced approach to device configuration management that is unmatched in the industry.

Device Specific Cloning
New devices can be configured and installed by copying similar existing devices. The user can clone the device information from multiple sources; an off the shelf device, the DMS database, or the DMS library of standard devices.

System Cloning
Copying of device information can be performed on a system basis as well. A system can be copied and used as a baseline for developing a similar system for a new division.

Calibration Management

Calibration Procedures
Calibration procedure details, such as number of test points and pass/fail criteria can be developed and applied to devices individually or in groups. These procedures are maintained in a library for future use and editing.

Scheduling/Planning
Calibration due dates can be assigned to devices, optimizing productivity through planning of calibration activities. Due dates can be assigned according to quality control, Safety Instrumented System ratings, or any other critical requirements. User definable pre-notices can be applied to notify users of coming calibration needs.

Calibration Alerts
Alert settings based on, for instance, calibration due date are assigned to devices and calibration equipment. When the criteria for the settings are met, the associated device is reported to an Alerts Log for easy access and disposition.

Action Lists
An Action List is the tool that DMS uses to group multiple activities to be assigned to calibration and maintenance technicians. The Action List is downloaded to the MFT and acts as a "To-Do List" of activities. The Action List activities are organized by DMS to track and ensure completion of assigned activities.

Preventative Maintenance
Utilization of the Action Lists and scheduling features enable the development of a preventive maintenance plan based on manufacturer's recommended calibration cycles, plant standard practices, or historical activity for a device.

Device History (Audit Trail)
Any action performed on a device is electronically stamped with date, time, user, description of activity, user ID and notes. Each device has its own log of associated activities. Trending of calibration results over the history of the device can be reviewed for predictive maintenance.

3rd Party Application Feature
DMS has a provision for the association of original manufacturers' software applications for devices like control valves, radar level devices, and flowmeters. Results from these applications are stored in DMS with the device history. The application can be launched from DMS when viewing device history.

DMS

The Complete Calibration & Configuration Management Solution

Ordering Information

DMS Client & Server Software

DMSBASXX-11-1	Calibration & configuration management where “xx” is 01, 05, 10, or 15 for number of clients.
DMSCFGXX-11-1	Configuration management only
DMSCALXX-11-1	Calibration management only

DMS Documenting Process Calibrator or Communicator Interface to DMS

DMSDP01-CFG	HART Field device configuration data interface
DMSDP01-CAL	Calibration procedures / results data interface
DMSDP01-ALL	Calibration & Configuration data interface

Documenting Process Calibrator (DPC) And Communicator Interface (MFT 4000 Series)

Calibration Equipment Tracking
The MFT, modules and MFC are electronically registered with DMS via the DPC Interface. Every action performed is associated with the unique ID of the equipment used.

Documenting Calibration and Configuration Data
The Documenting Process Calibrator/Communicator (DPC) reads and stores calibration test points/results (As-Found/As-Left), and device configuration changes.

Upload/Download Functions
Calibration Schedules (Action Lists) are generated by DMS and downloaded to the DPC for processing. Once the activities of the Action List are completed and documented by the DPC, the information is uploaded from the DPC to the DMS database. DMS tracks work-in-progress, planned calibration and planned configuration activities.

Industry Standard Compliance

Field Calibrator Interface Support
DMS uses an open standard for communicating with Documenting Process Calibrators (DPC’s).

Non-Proprietary
The DMS and MFT/MFC utilize a Device Object File (DOF) to communicate with HART devices. Although the DOF technology is protected, full access to the technology is available through the Device Management Solution’s open interface architecture.

Plant Application Compatibility
The DMS application was developed using SQL server database, which has features that lend itself to supporting ODBC data exchange and functionality with other plant applications. The DMS has export/import capabilities to support manual data exchange including features to map data from/to other popular device databases.

Device Management System (DMS) Software

MS SQL Data Server
Powerful Microsoft SQL data server provides network access via the DMS client application. This widely used database platform enables connectivity to other plant solutions.

Import/Export Utilities
Device data can be imported via DMS generated templates for the initial population of the DMS database and for exchanging data with other applications. Data that is imported can be mapped to the device’s HART configuration parameters. This also provides non-HART applications a “portal” to the device configurations.

Activity Logging
Logging of activities related to a device such as alerts, configuration, calibration or any other action that impacts a device.

Reporting/Queries
Standard reports, such as calibration certificates, activity log and scheduled activities. The user can generate custom queries that can be printed or exported for use in other applications.

Associated Documents
Provides links to relevant documents such as technical specifications, calibration certificates, standard operating procedures and CAD documents. When selected, the documents open in their native application.

Smart Handheld Manometers

A digital manometer is a microprocessor-based instrument that can be stationary or portable. Meriam digital manometers offer excellent hand-held performance at a value price. Features include min/max capture, data record, averaging and timed pressure tests. Digital or "smart" manometers are well suited for field measurement and process control. Meriam is considered a leader in the manufacture of smart manometers as well as analog manometers.

PICTURE. PERFECT. PRECISION.

Since 1911, Meriam has been a proud supplier of measurement and calibration solutions. Founded on the application of emerging technologies to solve measurement problems, Meriam remains committed to apply and develop new and emerging technologies to best meet the needs of today's industry.

Model 35EE Portable Digital Manometer/Calibrator

The Meri-Cal is a portable digital device designed for very precise pressure or differential pressure measurements. It is also capable of voltage and current measurements. This dual (simultaneous) measurement and display capability, high accuracy and traceability to the NIST uniquely qualify it for calibration of electronic transducer/transmitters as well as mechanical gauges and recorders.

Our Meri-Cal I calibrators have a single pressure sensor with integral voltage and current meters, for convenient pressure transmitter calibration. Accuracy specifications and temperature performance are the best available and NIST certifications are standard.

M2 Series Smart Manometer

Designed to facilitate pressure calibration and monitoring processes, the M2 Smart Manometer offers 11 selectable user units as well as 1- or 5-point field recalibration for zero, span, and linearity. Ranges handle gauge, differential, absolute, or vacuum pressure, and Min/Max feature captures varying signal extremes. With accuracy to serve as pressure reference standard, the unit also provides leak test and flow functions. The compact polycarbonate enclosure measures 6.5 x 3.6 x 2.25 in.

M202 Precision Absolute Manometer

Meriam's M202 Precision Absolute Manometer is very useful as a surveyor's tool because it accurately measures changes in altitude. Like Meriam's other smart manometers, it is hand-held for convenience and portability.

Powered by field replaceable 4 AA alkaline batteries, the unit includes a 0.25 in. display that can be read out in 9 engineering units. The combination of accuracy and fluid compatibility makes the M202 ideal for environmental, test or real-time process measurements of pressure relative to absolute zero.

M1 Series Digital Manometer/Calibrator

Our M1 Series of digital manometers/calibrators offer excellent handheld performance at a value price. Choose from the M100 Digital Manometer with a ± 0.25% FS accuracy. Need better accuracy but don't want to pay the high-prices associated with it? Then the M101 Calibrator is for you. Along with its additional features, it provides more exacting measurements (± 0.10% FS accuracy) and still saves you money.

The M2 features NIST traceable accuracy of ± 0.025% F.S., independent of temperature from 23° to 122°F (-5° to 50°C).

OUR COMPETITORS DON'T EVEN COME CLOSE!

CUSTOMER TESTIMONIAL

Meriam was the obvious choice when it came to ordering my M2 Smart Manometer. This was the first time I have bought a handheld manometer – and their level of expertise impressed me as I did have a lot of questions. I have used the manometer numerous times in the field and am happy with the accuracy and reliability of the product.

-Field Engineer

Model 35EE

Meriam Portable Digital Manometer / Calibrator

The Meri-Cal is a portable digital manometer/calibrator for pressure and differential pressure measurement. It features high accuracy and rugged design which brings laboratory test and calibration capability to the field.

Meri-Cal's display simultaneously indicates pressure (or differential pressure) and electronic transducer/transmitter output in any of 8 key selectable engineering units. Meri-Cal continues to be the most cost effective and useful method of precise measurements.

Meri-Cal is available with CSA certification for intrinsic safety for use in Class I, Groups A, B, C and D areas.

Merical Model 35EE Features

Engineering Units
In H_2O at 20°C, cm H_2O, PSI, in Hg at 0°C, mm Hg, Kg/cm^2, kPa, mBar and user scaled.

Rugged Design
The case is made of impact resistant, injection molded ABS material. The keyboard is a sealed membrane type having a chemical resistant polyester surface with tactile feedback type keys. Internal components have a protective conformal coating.

Applications
The Meri-Cal may be used for test measurement of pressure or differential pressure and as a calibrator for mechanical recorders, gauges, pneumatic controls and electronic transducers and transmitters.

Auto Zero
A push of a button automatically establishes zero. There is no need to compute compensation factors for local gravity, temperature or head difference due to the location of the tester versus the unit under test.

Model 35EE

Meriam Portable Digital Manometer / Calibrator

Ordering Information

Models/Ranges

LP200I and DP200I	200" H_2O (500 mbar)
LP2000I and DP2000I	2000" H_2O (5.0 bar)
All Models	Voltage: 0 to 30 Vdc
	Current: 0 to 30 mAdc

LP models measure gauge pressure only. DP models can be used to measure differential pressure, gauge pressure and vacuum.

Accessories/Options

- Hand Pump - can generate 145 PSI. Built in vernier provides precise adjustment of pressure while a needle valve allows for a controlled release of pressure.
- AC powered battery charger is switchable from 110 Vac to 220 Vac, 50/60 Hz.
- Test Lead Kit contains electrical connectors for adapting the Meri-Cal to read outputs from transmitters and transducers.

Meri-Cal kit includes the Meri-Cal, ABS plastic carrying case with die cut foam inserts, pressure pump, pneumatic quick connect fittings and tubing, electrical test leads kit and AC powered battery charger. All kit items can be purchased separately.

All Meri-Cals ordered without the kit have a soft vinyl, padded carrying case.

Specifications	
Accuracy	Pressure: ± 0.1% of reading, ± 1 count Voltage/Current: ± 0.1% of reading, ± 2 counts Accuracy includes the combined effects of linearity, hysteresis, repeatability and temperature over the calibrated range. All units are provided with certificates of NIST traceability.
Display	8 digit (4 pressure or D/P and 4 voltage or current) LCD type with .3" high (7.6 mm) digits.
Resolution	4 digit auto-ranging for optimal accuracy and resolution of the display for both pressure and electrical inputs.
Temperature Range	Storage: -40°F to 140°F (-40°C to 60°C) Operating: -20°F to 122°F (-29°C to 50°C) Effect: None within the range of -4°F to 104°F
Media Compatibility	For use with clean, dry, non-corrosive and non-conductive gases only.
Enclosure	Weighs less than 1.1 pounds (0.5 kg). Overall dimensions are 4" x 7.5" x 1.9" (102mm x 191mm x 48mm).

M1 Series

Digital Manometer/Calibrator

The M1 Series of handheld manometers from Meriam Process Technologies combines form, fit and function to deliver precision pressure measurement for field, plant or lab use. For reference indication and shirt pocket convenience, select the low cost M100 Digital Manometer with its +/- 0.25% FS accuracy. Or specify the M101 Calibrator when better accuracy is needed for more exacting measurements. The M101 delivers +/- 0.10% FS accuracy and additional features normally found on higher priced instruments. Both models are available in differential, gauge and absolute pressure versions.

Applications

- Leak testing for low pressure gas systems
- Pressure drop monitoring across filters
- Monitoring vacuum on condensers or pumps
- Verification of CPAP or BIPAP systems for home or hospital settings

M1 Series Advantages

Engineering Units (8-selectable)
Inches of H_2O @ 20°C, mm of H_2O @ 20°C, mm of Hg @ 0°C, Inches of Hg @ 0°C, kPa, mBar, Bar, PSI and user selectable.

Media Compatibility
Non-isolated sensor for clean, dry, non-corrosive gases.

Pressure Limits
(DN) units - 3 x F.S. on high side only or 200 PSI, whichever is less.
(GN or AN) units - 3 x F.S. range or 200 PSI, whichever is less.

Accuracy
M100: ±0.25% FS
M101: ±0.10% FS
No temperature effect over the entire operating range 14°F to 122°F (-10°C to +50°C).

Min/Max (M101 only)
Displays the MIN and MAX pressures.

Hold (M101 only)
Freezes the pressure measurement on the display, however, the bar graph is still active.

Ave (M101 only)
Displays a continuous filtered average of the pressure measurements.

Temp
Displays the internal ambient temperature of the M1 in °C or °F.

Record Mode
The M1 can store up to 240 pressure measurements.

- Automatic – the current value is auto-matically stored every 5 seconds, for up to 20 minutes.
- Manual – the current value is stored every time the Units key is pressed, up to 240 times.

Backlight
A green backlight is user activated via the backlight key. A red backlight is automatically activated during an error/over-range condition.

Battery Life
300 hours without backlight

Auto Shutoff
To conserve battery life, the M1 will automatically power off after 20 minutes of keypad inactivity.

Field Recalibration
M1 can be calibrated in the field for zero and span.

Low Battery Indication
BAT icon is displayed when batteries require replacement. Approximately 2 hours of run time is provided on a low battery condition.

Bar Graph
Horizontal bar for full scale pressure reference (0-100%).

M1 Series

Digital Manometer/Calibrator

Ordering Information

Model Number & Description

M100 - (specify pressure range) - Digital Manometer
M101 - (specify pressure range) - Calibrator
All models include the protective red rubber boot,
4 AA batteries, and hard copy of the user's manual

Optional Accessories

ZA34386 Calibration Kit, Includes:
(3) Nylon tubing, 6 ft., PN: A34103-3,
(2) Tee, Brass, ⅛" O.D. Tubing PN: A34112,
(1) Adapter, 3⁄16" Hose Barb to ⅛" MNPT PN:A34142-2,
(6) Adapter, ⅛" O.D. Tube to ⅛" MNPT PN: A34012

ZA34477 Basic Test Kit, Includes:
Nylon Tubing, 10 FT., PN: A34103-2
Adapter, Brass, Tubing to ⅛" MNPT PN:A34102

Z9A000053 ABS plastic carrying case

Z9P000058 Spare Protective Boot – Red
(each M1 comes standard with a protective boot)

Z1055 NIST Traceable Certificate with Data

Type	Range	D/G/A
DN0028	0 to 28.00" H_2O	Differential
DN0138	0 to 138.0" H_2O	Differential
DN0416	0 to 416.0" H_2O	Differential
DN0832	0 to 832.0" H_2O	Differential
DN2000	0 to 2000" H_2O	Differential
GN0005	0 to 5.000 PSI	Gauge
GN0015	0 to 15.00 PSI	Gauge
GN0030	0 to 30.00 PSI	Gauge
GN0050	0 to 50.00 PSI	Gauge
GN0100	0 to 100.0 PSI	Gauge
AN0775	0 to 775.0 mm Hg	Absolute
AN1551	0 to 1551 mm Hg	Absolute
AN2585	0 to 2585 mm Hg	Absolute

Specifications	
Base Unit	Lightweight and ergonomic, 12 oz. and (6.0" x 3.0" x 1.0") with ESD dissipative polycarbonate
Keypad	Sealed membrane type with 4 dome style contact buttons
Temperature Specifications	Storage: -40°F to 140°F (-40°C to 60°C) Operating: 14°F to 122°F (-10°C to 50°C)
Power	3 AA batteries providing over 300 hours of continuous use.
Connections	⅛" female NPT 316SS. All models have a P1 and P2 port. GN and AN units have a sintered metal disc installed on P2.
NIST Traceable Accuracy	M100 Digital Manometer: ± 0.25% F.S. M101 Calibrator: ± 0.10% F.S.
Certifications	CE Mark comes standard with product NIST Traceable Certificate with Data (optional)

M2 Series

Smart Manometers

Meriam's M2 Series Smart Manometers bring high precision and value to handheld, digital manometer users. The M2 features NIST traceable accuracy of ±0.025% of F.S., independent of temperature effect. Pressure ranges from 28" H2O F.S. to 2000 PSIG F.S. are available.

M2 pressure sensors are available to measure gauge, differential, absolute or vacuum pressure. The display can read out in any of eleven pressure units or can be linearly scaled for special user units. Differential models offer a square root flow function to display flow rate in user defined units.

An adjustable damping feature minimizes the effects of pulsating pressures. A Min/Max function captures the extremes of pulsating or varying pressure signals and a Hold function can freeze the display at any point of interest. Auto Record documents up to 240 readings for future recall.

M2 Series Advantages

Accuracy
± 0.025% FS or optional ± 0.05% F.S. No temperature effect from 23º to 122ºF (-5º to +50ºC).

Certifications
Ex ia IIC T4; Class I, Div.1 Groups A,B,C,D, T4

Engineering Units
Inches of H_2O (select 4ºC, 20ºC, or 60ºF), PSI, mm of Hg, inches of Hg, mBars, Bars, kPa, kg/cm^2, cm of H_2O and user selectable scaling.

Media Compatibility
DN: Non-isolated differential sensor for clean, dry, non-corrosive gases.
GI & AI: Isolated Gauge or Absolute sensor for fluids compatible with 316L SS. *See Meriam's M200-DI for wet/wet DP requirements.*

Pressure Limits
Twice range on Gauge and Absolute (GI and AI) units. Twice range on Differential (DN) units when pressurized on high side only and 150 PSI (10.5 Kg/cm^2) static when applied to both sides of the sensor simultaneously.

Leak Test
Allows users to view Min/Max pressure values and calculates leak rate per minute in pressure units. The feature is very handy when troubleshooting or pressure testing pneumatic systems.

Auto Record
Document up to 240 readings (automatically or manually) to reduce paperwork and field time. Saved readings can be recalled at any time.

Damping Rates
Exponential damping with user selectable time constant from 0.1 to 25 seconds.

Min/Max Capture
Capture speed is equal to the selected damping rate.

Field Re-cal
The M2 series can be recalibrated in the field for zero, span, and linearity. The user has the option to select a 1 point or 5 point calibration procedure. Enables users with accurate primary standards to calibrate their devices locally if desired.

Auto Shut-Off
User selectable shut-off. Programmable at 10, 20, 30, 45, 60 minutes.

M2 Series

Smart Manometers

Ordering Information

Model Number & Description
M200 (specify pressure range) Smart Manometer

All Models Include
- Protective Red Boot
- 4 AA Alkaline batteries
- Hard copy user's manual

Optional Accessories

Z9A000069	Hard Carrying Case
Z9P000108	Hard Carrying Case with Vacuum Pump
Z9P000109	Hard Carrying Case with Pressure Pump
ZA34386	Connector Kit, brass

Specifications	
Base Unit	14 oz. (6.5" X 3.6" X 2.25") polycarbonate, permanently dissipative, ESD protection.
Keypad	Sealed membrane type with 5 dome contact style buttons.
Display	5 significant digit LCD (0.25" high) 2 line x 16 alphanumeric characters with contrast adjustment. Two stage backlight with visual over-range indication.
Power	4 each AA batteries providing over 100 hours of continuous use.
Wetted Parts	DN: 316L SS, brass, viton GI: 316L SS AI: 316L SS
Connections	⅛" female NPT, 316L SS
NIST Traceable Accuracy	Pressure: ± 0.025% of F.S. or ± 0.05% F.S. typical. DN0028 ± 0.1% of F.S. Accuracy statement includes all affects of temperature over specified operating range.
Temperature Specifications	Storage: -40°F to 140°F (-40ºC to 60°C) Operating: 23°F to 122°F (-5°C to 50°C) I.S Models -4°F to 122°F (-20°C to 50°C) G.P Models
Pressure Ranges	DN0028 0-28" H_2O Differential (0.1% F.S.) DN0200 0-200" H_2O Differential DN2000 0-2000" H_2O Differential GI0015 0-15 PSI Gauge GI0030 0-30 PSI Gauge GI0200 0-200 PSI Gauge GI2000 0-2000 PSI Gauge AI0038 0-2000 mm Hg/ 0-38 PSIA Absolute
Certifications	CE 0539 Ex II 1 G Ex ia IIC T4 DEMKO 06 ATEX 0615699 IP 40 Class I, Div. 1 Groups A,B,C,D, T4 Intrinsically Safe, Exia Class I, Zone 0, AEx ia IIC T4 Class I, Zone 0, Ex ia IIC T4 -5 C < Ta <+50 C c UL us LISTED 22W1

M200-DI

Wet/Wet Differential Pressure Smart Manometer

Meriam's M200-DI handheld Smart Manometer for liquids brings high accuracy to wet/wet differential pressure applications. Potentially corrosive or wet gasses are also handled by the M200-DI. Wetted parts are 316L SS with Viton O-rings (consult factory for other materials). The M200-DI features NIST traceable accuracy of ±0.05% FS (±0.025% FS optional) independent of temperature effect from 23º to 122ºF for Intrinsically Safe models. The accuracy statement is good from -4º to 122ºF for general purpose models.

Pressure ranges are available from 0 - 1 PSID to 0 - 500 PSID. All ranges are rated for 1000 PSI common mode pressure. HI side overpressure rating is 3X F.S. while the LO side overpressure rating is 3X F.S. or 150 PSI, whichever is less. Optional flushing ports (pending) allow solvent clean-out of P1 and P2 ports or can be used to vent air from the connecting tubing of liquid applications.

The display can read in any of 11 pressure units or can be linearly scaled for special user units. A square root flow function allows the M200-DI to display flow in user defined engineer units. The user selectable damping feature minimizes pulsation effects. The Min/Max function captures the extremes of pulsating pressure signals and the Hold function freezes the display for convenient reading if needed. Auto Record documents up to 240 reading for future recall.

M200-DI Advantages

Accuracy
± 0.05% FS or optional
± 0.025% F.S. No temperature effect over specified operating temperature

Certifications
CE (standard)
Ex ia IIC T4
Class I,Div.1 Groups A,B,C,D, T4

Engineering Units
Inches of H_2O (select 4ºC, 20ºC, or 60ºF), PSI, mm of Hg, inches of Hg, mBars, Bars, kPa, kg/cm^2, cm of H_2O, user selectable scaling, sq. root.

Media Compatibility
DI: Isolated differential sensor for fluids compatible with 316L SS and Viton.

Pressure Limits
Common mode:
1,000 PSI
P1 (HI) only: 3X F.S.
P2 (LO) only: 3X F.S. or 150 PSI, whichever is less

Leak Test
Allows users to view Min/Max pressure values and calculates leak rate per minute in pressure units. The feature is very handy when trouble-shooting or pressure testing pneumatic systems.

Auto Record
Document up to 240 readings (automatically or manually) to reduce paperwork and field time. Saved readings can be recalled at any time.

Min/Max Capture
Capture speed is equal to the selected damping rate.

Damping Rates
Exponential damping with user selectable time constant from 0.1 to 25 seconds.

Field Re-cal
The M200-DI series can be recalibrated in the field for zero, span, and linearity. The user has the option to select a 1 point or 5 point calibration procedure. Enables users with accurate primary standards to calibrate unit locally if desired.

Auto Shut-Off
User selectable shut-off. Programmable at 10, 20, 30, 45, 60 minutes.

M200-DI

Wet/Wet Differential Pressure Smart Manometer

Ordering Information

All Models Include

- Protective Red Boot
- 4 AA Alkaline batteries
- User's manual

Order Options

- Intrinsic Safety Certification
- Flushing ports (pending)
- ±0.025% of F.S. or ±0.05% F.S.

Optional Accessories

Z9A000069	Hard Carrying Case
Z1066-11	M10-KT Hydraulic scissor pump, 0-10,000 PSIG includes hoses, fittings & carry bag
Z1089	3-valve manifold assembly, 316 SS

Manifold Options

Standard Manifold

Flushing Manifold
(pending)

Specifications

Base Unit	30 oz. (6.5" X 3.6" X 2.25") polycarbonate, permanently dissipative, ESD protection.
Keypad	Sealed membrane type with 5 dome contact style buttons.
Display	5 significant digit LCD (0.25" high) 2 line x 16 alphanumeric characters with contrast adjustment. Two stage backlight with visual over-range indication.
Power	4 each AA batteries providing over 100 hours of continuous use.
Wetted Parts	316L SS, Viton O-rings Consult factory for other O-ring materials
Connections	⅛" female NPT, 316L SS, HI and LO ports 5/16 - 24 SAE/MS J1926 flushing ports with 316L SS plugs (2 each, optional)
NIST Traceable Accuracy	Pressure: ± 0.025% of F.S. or ± 0.05% F.S. (including all effects of temperature over specified operating range)
Temperature Specifications	Storage: -40°F to 140°F (-40ºC to 60°C) Operating: 23°F to 122°F (-5°C to 50°C) I.S Models -4°F to 122°F (-20°C to 50°C) G.P Models
Pressure Ranges	DI0001 0-1 PSID Differential (pending) DI0005 0-5 PSID Differential DI0015 0-15 PSID Differential DI0030 0-30 PSID Differential DI0100 0-100 PSID Differential DI0300 0-300 PSID Differential DI0500 0-500 PSID Differential
Certifications	CE 0539 Ex II 1 G Ex ia IIC T4 DEMKO 06 ATEX 0615699 IP 40 Class I, Div. 1 Groups A,B,C,D, T4 Intrinsically Safe, Exia Class I, Zone 0, AEx ia IIC T4 Class I, Zone 0, Ex ia IIC T4 -5 C < Ta <+50 C c UL us LISTED 22W1

M201

Rotary Gas Meter Tester

The M201 Rotary Gas Meter Tester is specially programmed to measure the differential pressure, and display the true average of those measurements. The amount of time over which the averaging occurs is controlled by the user. This feature addresses the flow surge and pulsation concerns.

The M201 Rotary Gas Meter Tester has an accuracy of 0.1% FS (28" H_2O range) or 0.05% FS (200" H_2O range). This provides better accuracy in the low DP ranges as compared to mechanical gauges or manometers. The M201 Rotary Gas Meter Tester is well suited for use in the field, its accuracy is not affected by temperature over its calibrated range of 23ºF to 122ºF. This temperature effect on mechanical gauges, liquid manometers and some digital indicators can result in serious accuracy errors.

The digital display eliminates parallax errors, and depending on the range of the gauge, it can have a resolution of 0.01 or 0.001" H_2O. A min/max feature also allows the user to see the minimum and maximum pressures recorded during the test. The unit is portable, and with the integral push to read manifold, the M201 Rotary Gas Meter Tester can safely be used with lines having a static pressure of up to 150 PSIG.

M201 Advantages

Accuracy
DN0028: ±0.1% FS 0-28"
DN0200: ±0.05% FS 0-200"
No temperature effect from 23º to 122ºF (-5º to +50ºC).

Engineering Units
Inches of H_2O (select 4ºC, 20ºC, or 60ºF), PSI, mm of Hg, inches of Hg, mBars, Bars, kPa, kg/cm^2, cm of H_2O and user selectable scaling.

Media Compatibility
DN: Non-isolated differential sensor for clean, dry, non-corrosive gases.

Field Re-cal
The M201 can be recalibrated in the field for zero, span, and linearity. The user has the option to select a 1 point or 5 point calibration procedure. Enables users with accurate primary standards to calibrate their devices locally if desired.

Pressure Limits
Twice range on Differential (DN) units when pressurized on high side only and 150 PSI (10.5 Kg/cm^2) static when applied to both sides of the sensor simultaneously.

Min/Max Capture
Capture speed is 10X per second.

Operation
A push-to-read valve keeps HI and LO sides equalized during connection across meter. Turn M201 "ON" to get message "Press Hold to Acquire Data." Press "Hold" key to start test. User determines test time, ending test by pressing the "Hold" key again. Display will show the averaged differential pressure across the meter from test start to test stop. Press the "Hold" key again to start a new test.

Auto Shut-Off
User selectable shut-off. Programmable at 10, 20, 30, 45, 60 minutes and disable.

M201

Rotary Gas Meter Tester

Ordering Information

Model Number & Description

M201 (specify pressure range) Rotary Gas Meter Tester
(only available with DN0028 or DN0200 sensor range
and includes integral push to read valve assembly)

All Models Include

- Protective Red Boot
- 4 AA Alkaline batteries
- Hard copy user's manual

Order Options

Z9A000069	Hard Carrying Case
Z9P000108	Hard Carrying Case with Vacuum Pump
Z9P000109	Hard Carrying Case with Pressure Pump
ZA34386	Connector Kit
ZA900016-90727	Pete's Plug Adapter Kit Y ⅛" Needle
ZA900016-90733	Pete's Plug Adapter Kit Y 1/16" Needle

Specifications	
Base Unit	14 oz. (6.5" X 3.6" X 2.25") polycarbonate, permanently dissipative, ESD protection.
Keypad	Sealed membrane type with 5 dome contact style buttons.
Display	5 significant digit LCD (0.25" high) 2 line x 16 alphanumeric characters with contrast adjustment. Backlight included.
Power	4 each AA batteries providing over 100 hours of continuous use.
Wetted Parts	DN: 316L SS, brass, viton
Connections	⅛" female NPT, 316L SS
NIST Traceable Accuracy	DN0028: ± 0.1% of FS DN0200: ± 0.05% of FS Accuracy statement includes all affects of temperature over specified operating range.
Temperature Specifications	Storage: -40°F to 140°F (-40ºC to 60°C) Operating: 23°F to 122°F (-5°C to 50°C) I.S Models -4°F to 122°F (-20°C to 50°C) G.P Models
Pressure Ranges	DN0028 0-28" H_2O Differential (0.1% F.S.) DN0200 0-200" H_2O Differential (0.05% F.S.)
Certifications	CE Ex ia IIC T4 DEMKO 06 ATEX 0615699 IP 40 Class I, Div. 1 Groups A,B,C,D, T4 Intrinsically Safe, Exia Class I, Zone 0, AEx ia IIC T4 Class I, Zone 0, Ex ia IIC T4 -5 C < Ta <+50 C c UL us LISTED 22W1

M202

Precision Absolute Manometer

Meriam's model M202 Precision Absolute Manometer brings calibration bench accuracy to a portable, handheld unit. The pressure sensor is all 316SS allowing it to be used with liquids, gasses and corrosives compatible with 316SS. This combination of accuracy and fluid compatibility makes the M202 ideal for environmental, test or real-time process measurements of pressure relative to absolute zero.

The M202 includes features for minimum and maximum (Min/Max) value capture, tare readings and user selectable engineering units. A selectable altitude function allows users to enter site altitude above sea level in order to display local barometric pressure or barometric pressure corrected to sea level. User referenced altitude (referenced to map or trig markers) or altitude based on US Standard Atmosphere of 1962 can be selected for display. Using the altitude function with the Min/Max and Tare features makes the M202 very useful as a surveyor's tool to accurately measure changes in altitude.

M202 Advantages

Approvals
CE compliant
Optional Intrinsically safe per ATEX and cULus

NIST Traceability
NIST certificate supplied for all models

Media Compatibility
Isolated Al sensor for fluids compatible with 316SS

Pressure Limits
77 PSIA (4,000 mm Hg Abs) for both AI0017 and AI0038

Tare
Nulls applied pressure to allow measurement of vacuum, gauge pressure or change in pressure or altitude from a reference point

Min/Max Capture
Capture speed is equal to the selected damping rate

Damping Rates
User selectable from 0.1 to 25 seconds

Backlight
Green; changes to Red for over pressure
Engineering Unit Selection – mm Hg, PSI, in. Hg, mbar, bar, kPa, Torr, feet, meters

Altitude
Displayed in feet or meters. Can be set by user based on map or trig marker information or standard altitude uses U.S. Standard Atmosphere of 1962 data

Contrast Adjustment
Adjusts display for best viewing

Field recalibration
Supported through firmware feature

M202

Precision Absolute Manometer

Ordering Information

Model Number & Description
M202 (specify pressure range)

All Models Include
- Protective Red Boot
- 4 AA Alkaline batteries
- Hard copy user's manual

Order Options
Z9A000069	Hard Carrying Case
Z9P000108	Hard Carrying Case with Vacuum Pump
Z9P000109	Hard Carrying Case with Pressure Pump
ZA34386	Connector Kit, brass

Specifications		
Base Unit	14 oz. (6.5" X 3.6" X 2.25") polycarbonate, permanently dissipative, ESD protection.	
Keypad	Sealed membrane type with 5 dome contact style buttons.	
Display	5 significant digit LCD (0.25" high) 2 line x 16 alphanumeric characters	
Power	4 AA batteries with user-enabled automatic shutoff	
Wetted Parts	AI: 316L SS	
Connections	⅛" female NPT, 316SS	
NIST Traceable Accuracy	AI0017 AI0038	±0.02% FS, Intrinsically Safe (cULus and ATEX) ±0.015% FS from 0 to 1000 mm Hg Absolute ±0.025% FS from 0 to 2000 mm Hg Absolute, Intrinsically Safe (cULus and ATEX)
Temperature Specifications	Storage: Operating:	-40°F to 140°F (-40ºC to 60°C) 23°F to 122°F (-5°C to 50°C)
Pressure Ranges	AI0017 AI0038	0-17 PSIA (0-900 mm Hg) Absolute 0-38 PSIA (0-2000 mm Hg) Absolute
Certifications	CE 0539 Ex II 1 G Ex ia IIC T4 DEMKO 06 ATEX 0615699 IP 40	Class I, Div. 1 Groups A,B,C,D, T4 Intrinsically Safe, Exia Class I, Zone 0, AEx ia IIC T4 Class I, Zone 0, Ex ia IIC T4 -5 C < Ta <+50 C c UL us LISTED 22W1

Electronic Handheld Calibrators

Now more than ever, there is an increased focus on driving down costs by calibrating instruments on a fixed schedule. By adhering to this preventative maintenance practice, technicians limit the amount of failures that occur in the field therefore reducing downtime.

Calibrators used to perform this work must be more accurate than the instruments being tested. The normal accepted industry standard of TUR (Test Uncertainty Ratio) is 4:1, meaning the calibrator must be at least 4 times more accurate than the instrument under test.

Whether used in a controlled lab environment or outside in 30°F weather, Meriam's calibrators maintain the 4:1 ratio and are among the industry's best in accuracy over temperature. Choose the accuracy that best works for your application: either in percentage of full scale or valid reading throughout the entire operating range. From simulating and measuring a 4-20mA instrument loop or calibrating a temperature transmitter - Meriam has got you covered.

PICTURE. PERFECT. PRECISION.

With the M130, you get the best accuracy with the best value – our competitors don't even come close:

Meriam:
± 0.005% Reading ± 6µ

Closest Competitor:
± 0.008% Reading ± 6µ

M130

The M130 was created in response to the industry's need for digital technology to verify temperature accuracy. It has the ability to measure and simulate thermocouples for the common types used throughout the industry. The M130 thermocouple calibrator features the latest component and circuit design for top of the line accuracy and stability, all in a portable handheld package. The large display with its intense green backlight makes it one of the easiest T/C calibrators to read.

Feature	Benefit
No Temperature Effect	Consistent Measurement
Record Feature	No pen & paper required in the field
Auto Ramp & Step	Rapidly test entire T/C range
Backlight	Readability
Size	Versatility
Accuracy	Best in Class
Off Timer	Conserve battery life

M334

Meriam's M334 4-20 Milliamp Loop Calibrator can perform all the required maintenance and calibration tasks of virtually any 4-20mA loop.

In the example below, the M334 can be used anywhere temperature, pressure and flow applications are present in the production of canned corn. Imagine what it can do for your applications:

Process Control for Corn

Steel
Mining Ore
Mining Coal
Trucks
Fuel*
Shipment to Smelter

At Smelter
Weighing System
Electricity*
Fuel*
Temperatures
Pressures
Flow
Motor Speed
Shipment to Fabricator

At Fabricator
Electricity*
Fuel*
Temperatures
Pressures
Motor Speed

Corn
Seed
Fertilizer
Water*
Tractor
Fuel*
Shipment to Food Processor

At Food Processor
Weighing System
Mixers
Water*
Electricity*
Fuel*
Temperatures
Pressures
Flow

Paper
Tree Planting Trucks Fuel
Logging Trucks Fuel
Shipment to Fabricator

At Fabricator
Pulping Equipment
Mixers
Water*
Electricity*
Bleach
Variable Speed Drives
Dryers
Temperatures
Pressures
Flow
Shipment of Paper to Printer

For temperature, pressure and flow - the M334 has got you covered

Corn

Can

Label

At Printer
Print Label
Shipment to Food Processor

Ink
Raw Materials
Water*
Electricity*
Fuel*
Machinery
Temperatures
Pressures
Flows

Ink
Shipment to Printer

Adhesive
Raw Materials
Water*
Electricity*
Fuel*
Machinery
Temperatures
Pressures
Flows

Adhesive

Utilities
Ore Mining
Oil & Gas Wells
Gas Refining
Generating Plants

Fresh Water Plants
Water Treatment Plants
Temperatures
Pressures
Flows
Generator Speed

M334

4-20 Milliamp Loop Calibrator

The Meriam M334 is a state of the art, highly reliable, rugged and easy to use milliamp calibrator. It has the functions necessary to perform all the required maintenance and calibration tasks of virtually any 4-20mA loop. It provides source and read milliamp functions along with power and measure; and two wire transmitter simulations. In addition it can measure DC Voltage for troubleshooting power supplies.

The M334 is functionally equivalent to similar calibrators with many additional benefits. These improvements include better long term stability, accuracy, reliability and ruggedness including significantly improved battery life. The combined improvements allow the Meriam M334 to meet or exceed all of the expected performance and functions of similar products.

The M334 will also exceed the performance of many higher cost calibrators and meet today's most demanding requirements while maintaining the familiar, time proven reliability and ease of use of similar calibrators. This is the new standard!

M334 Advantages

All milliamp (mA) loop functions
- Source 0.00 to 24.00 mA (-25.0% to 125.0%)
- Read 0.00 to 52.00 mA (-25.0% to 300.0%)
- Simulate 2-Wire Transmitters
- Power and measure 2-Wire Transmitters

Accuracy to better than 0.025% (±½ LSD)
- Within ± 0.005 mA from 4.00 & 20.00 mA EZ-Checks

Large high contrast graphic display
- Viewable in all lighting conditions and angles

Read voltage function
- Read 0.00 to ± 99.99 VDC

EZ-Dial knob
- Easily adjust output by 0.01 mA (0.01%)

EZ-Check 3-position slide switch
- Instantly output 4.00 or 20.00 mA calibration values
- Adjustable in all 3 positions for easy valve testing
- Rugged, unbreakable with splash protection

Uses 4 standard "AA" alkaline batteries
- Battery life up to 70 hours of normal usage
- Easily accessible battery compartment

Overload protected
- 135 vrms Protection
- Fuse-less Protection from accidental misconnection

Compact, lightweight and rugged
- Small in size with heavy protective rubber boot

Rechargeable battery option available
- One hour rapid charger with four (4) NiMh Batteries
- Kit includes an AC adaptor and a car adaptor for charging on the go

M334

4-20 Milliamp Loop Calibrator

Source/Power & Measure Two Wire Transmitters

Ranges & Resolution	0.00 to 24.00 mA Full Span or -25.0 to 125.0% of 4-20 mA
Accuracy	
EZ Check(s) at 4 & 20mA[1]	≤ ±0.025% of Span at 4.00 mA & 20.00 mA (± 0.005 mA)
0.0 to 24.00 mA	≤ ± 0.05% of 24.00 mA Span (± 0.01 mA)
Noise	≤ ± 0.005 mA of Reading
Temperature Effect	≤ ± 0.005 % / °C of FS
Loop Compliance Voltage	≥ 24 DCV @ 20.00 mA
Loop Drive Capability	1200 Ω at 20 mA for 15 hours nominal
Battery Life	Source and Power measure mode ≥ 30 hrs at 12 mA nominal

Additional Specifications

Read mA	
Ranges	0.00 to 52.00 mA Full Span OR -25.0 to 300.0% of 4-20 mA
Accuracy Below 24.01 mA Above 24.00 mA	 ≤ ± 0.05 % of 24.00 mA (± 0.01 mA) ≤ ± 0.05 % of 52.00 mA (± 0.02 mA)
Voltage burden	≤ 2V at 50 mA
Overload/Current limit protection	54 mA nominal
Battery life	Typical ≥ 125 Hours nominal
2-Wire Transmitter Simulation	
Accuracy	Same as Source/Power & Measure
Voltage burden	≤ 2V at 20 mA
Overload/Current limit protection	24 mA nominal
Loop voltage limits	2 to 100 VDC (fuse-less protected from reverse polarity connections)
Battery life	≥ 125 hours nominal
Voltage Read	
Range and Resolution	-99.99 to +99.99 VDC Full Span (FS)
Accuracy	≤ ± 0.05 % of FS
Temperature effect	≤ ± 100 ppm/°C of FS
Input resistance	≥ 2 MΩ
Battery life	> 125 hours nominal

Specifications	
Operating Temperature Range	-20 to 60ºC (-5 to 140ºF)
Storage Temperature Range	-30 to 60ºC (-22 to 140ºF)
Relative Humidity Range	10% ≤RH ≤90% (0 to 35ºC), Non-condensing 10% ≤RH ≤70% (35 to 60ºC), Non-condensing
Size	L=5.63 x W=3.00 x H=1.60 inches
Weight	12.1 ounces (including boot & batteries)
Batteries	Four "AA" Alkaline 1.5V (Duracell MN1500 or equivalent) **Optional 120 VAC 50/60 Hz AC adaptor available NiMh Rechargeable battery kit available**
Miscellaneous	Low battery indication with nominal 1 hour of operation left Over-voltage protection to 135 vrms (rated for 30 seconds) or 240 vrms (rated for 15 seconds) High contrast graphic liquid crystal display with 0.413" (10.5 mm) high digits

M130

Thermocouple Calibrator

The M1 Series of handheld calibrators from Meriam Process Technologies combines form, fit and function to deliver precision measurement for field, plant or lab use.

Features

- Measure and source thermocouples
- Large, easy to read display with backlight
- Shirt pocket convenience
- Cold junction compensation
- T/C simulation (manual or auto)
- 3 programmable auto step routines (Units, T/C Type, LRV, URV, STEPS & DWELL TIME)
- 3 programmable auto ramp routines (Units, T/C Type, LRV, URV, STEPS UP/DOWN TIME, DELAY)
- Auto step simulation (0-100% or 25% increments) with definable LRV & URV

M130 Advantages

Thermocouple Types
Type B, E, J, K, N, R, S, T and millivolts

Accuracy
± 0.005% Reading ± 6 µV

Engineering Units
Displays the temperature of a T/C in °C, °F, °R, K and millivolts.

Record Mode
Store up to 240 temperature measurements.
- Automatic – the current value is automatically stored every 5 seconds, for up to 20 minutes.
- Manual – the current value is stored each time the Units key is pressed, up to 240 times.

Backlight
A green backlight is user activated via the backlight key. A red backlight is automatically activated during an over-range condition.

Auto Shutoff
To conserve battery life, the M130 will automatically power off after 30 minutes of keypad inactivity.

Low Battery Indication
BAT icon is displayed when batteries require replacement. Approximately 2 hours of run time remains when BAT appears.

M130

Thermocouple Calibrator

Measurement & Simulation Accuracy Table

T/C Type	± 3.0°C Accuracy	± 2.0°C Accuracy	± 1.0°C Accuracy	± 0.5°C Accuracy	± 0.4°C Accuracy	± 0.3°C Accuracy	± 0.2°C Accuracy	± 0.1°C Accuracy
E						-200 to -179°C	-179 to 15°C	15 to 1000°C
J						-200 to -165°C	-165 to 1200°C	
K					-200 to 1372°C			
N						-200 to 110°C	110 to 1300°C	
T					-200 to -168°C	-168 to -86°C	-86 to 346°C	346 to 400°C
R		-50 to 27°C	27 to 736°C	736 to 1768°C				
S		-50 to 25°C	25 to 1179°C	1179 to 1768°C				
B	250 to 295°C	295 to 605°C	605 to 1301°C	1301 to 1820°C				

Ordering Information

Model Number & Description

M130 - Includes protective red rubber boot, 3 AA batteries, shorting plug and user's manual

Optional Accessories

- Z9A84 — T/C Wiring kit with connectors (E, J, K, N, T, R/S, B and simulation cable)
- Z9A000053 — ABS plastic carrying case
- Z1055 — NIST Traceable Certificate with Data

Specifications	
Base Unit	Lightweight and ergonomic 12 ounces, 6.0" x 3.0" x 1.0"; ESD Dissipative polycarbonate
Keypad	Sealed membrane type with 12 dome style contact buttons
Power	3 AA batteries providing over 100 hours of continuous use.
Connections	Standard mini-T/C connector
Certifications	CE Mark (standard) NIST Traceable Certificate with Data (optional)
Temperature Specifications	Storage: -40°F to +185°F (-40°C to +85°C) Operating: 14°F to +122°F (-10°C to +50°C)

Industrial Wireless Systems

Wireless Measuring & Monitoring that Puts You in Control

Meriam Wireless offers a rugged and reliable way to easily implement wireless technology for measurement applications. The fully integrated wireless systems provide true “Out of the Box” installation and require no programming or special set up.

MERIAM WIRELESS ADVANTAGES

- APPROVED for Class I, Division 1 and Class general purpose environments.
- 900 MHz Frequency Hopping Spread Spectrum bandwidth transmits at 1 full watt.
- License free bandwidth. FCC license not needed.
- Battery life - Up to 5 years Selectable transmit power from 1 Watt to 1 mW to conserve battery life.
- Available in analog and discrete I/O.
- Transmitters available as Battery, AC or DC powered.

Take more frequent, accurate measurements from a central, safe location. Data transmission frequency can be configured to fit your operational requirements allowing for more frequent measurements in areas prone to more problems. Meriam Wireless systems assist in maximizing uptime by sensing where problems are just beginning, before they become costly shutdowns. The Meriam Wireless System utilizes license-free Frequency Hopping Spread Spectrum (FHSS) technology to protect data integrity with a highly secure and accurate signal.

Performance Features

- Rugged Design
- Flexible Power Options
- 1 Full Watt Transmit Power
- Transmit Data up to 3000 ft.
- Simple Installation
- Self Contained and Fully Integrated

Contact
Meriam Wireless
216-928-2225
www.meriam.com

An Innovative Combination of Rugged Design and Accuracy for Hazardous and Industrial Areas:

- Tank levels
- Power Generation
- Pipelines
- Chemical Processing
- Compressor Stations
- Process Control
- Flow Monitoring

Meriam Wireless

Wireless Instrumentation Enclosures

Division 1 Explosion-proof Ethernet Access Point

The AW-XAP series explosion-proof access point systems were designed to house WLAN access points, routers and bridges to extend 802.11b/g network coverage into hazardous Division 1 locations where potentially explosive substances are present under normal operating conditions. The AW-XAP consists of two Meriam Wireless AW-CTB-2400 2.4 GHz Division 1 antennas mounted atop an Adalet explosion-proof enclosure allowing users to use the WLAN access point of choice in a Class I, Division 1 area. A second version utilizing the Meriam Wireless glass dome allows for the mounting of stock whip antennas within the protection of the rugged domed glass design. The enclosure system carries third party approvals from UL and also carries the ATEX certification when specified.

AW-XAP-CTB • Div. 1 Access Point System w/ Div. 1 Antennas

AW-XAP-XJANT • Div. 1 Access Point System w/ Glass Domes for Standard Antennas

OEM Division 1 Explosion-proof Enclosure

The XJANT wireless instrumentation enclosure was designed to house the Meriam Wireless OEM wireless transmitter for use with existing OEM sensors and instrumentation. The XJANT with the AWJA / AWJD transmitter can be customized with a customer's unique logo or special paint color and can be ordered with a variety of conduit hub configurations and sizes.

XJANT • Meriam Wireless OEM Div. 1 Wireless Instrumentation Enclosure

Fiberglass Enclosure

This fiberglass enclosure is modified to mount wireless DIN rail devices. Durable molded fiberglass reinforced polyester construction with stainless steel latches. Enclosure includes extension cable with reverse polarity SMA bulkhead fitting and standard 35mm DIN rail for mounting wireless device. This enclosure can be used to protect wireless DIN rail mount device from harsh or corrosive environments for applications indoors as well as outdoors.

Z7820 • Fiberglass Enclosure

Meriam Wireless

Wireless Systems/Modems/Transceivers

Division 1 Explosion-proof Wireless System

Meriam Wireless point-to-point systems operate at a 900 MHz Frequency Hopping Spread Spectrum Bandwidth. The explosion-proof wireless systems includes transmitter and DIN rail mount receiver. Our explosion-proof transmitter is housed inside a dual-sided Adalet Class I, Division 1 instrument enclosure suitable for hazardous locations where potentially explosive substances are present under normal operating conditions. Each point-to-point system is able to transmitter one 4 to 20 mA analog signal with two dry contact discrete I/O's.

ZW17311 • Class I, Division 1 Battery Powered Wireless Transmitter with DIN Rail Receiver
ZW17211 • Class I, Division 1 AC Powered Wireless Transmitter with DIN Rail Receiver
ZW17011 • Class I, Division 1 DC Powered Wireless Transmitter with DIN Rail Receiver

DIN Rail Mount Wireless System

Meriam Wireless point-to-point systems come with a 900 MHz Frequency Hopping Spread Spectrum DIN rail mount wireless transmitter and DIN rail mount receiver. Each DIN rail wireless point-to-point system is able to transmitter one 4 to 20 mA analog signal with two dry contact discrete I/O's.

ZW11111• Battery Powered DIN Rail Mount Wireless System
ZW10011• DC Powered DIN Rail Mount Wireless System

Division 1 Explosion-proof Wireless RS-232 / 422 / 485 Modem

A Meriam/Adalet Wireless RF modem housed in an Adalet Class I, Division 1 instrument enclosure suitable for use in hazardous Division 1 locations where potentially explosive substances are present under normal operating conditions. The wireless RF modem is housed in a dual chamber Class I, Division 1 explosion-proof instrument enclosure, power supply, cables and fittings. Accessories included: quick start guide, configuration software, 2.1dB gain antenna, (1) serial loopback adapter, (1) null modem adapter (male to male), (1) Male RS-232 / 422 / 485 adapter, (1) female RS-232/422/485 adapter, (1) DB-9 to DB-9 female serial cable, and (1) 9V 1A power adapter.

AWB – S – X • Panel Mount RS-232 / 485 Transceiver
AWB – U – X • Panel Mount USB w/ Accessories

Panel Mount RS-232 / 485 Transceiver

For use in general purpose or industrial operations, the AWB serial bridge system consists of stand alone panel mount modem transceivers. The AWB modem is panel mountable for fast, screw in installation in a control cabinet or location of choice. The modem is factory or field programmable for RS-232 / 422 / 485 as well as update interval and transmit power. All programming values must be specified at time of quotation. Accessories include: quick start guide, configuration software, 2.1 dB gain dipole antenna, (1) serial loopback adapter, (1) null modem adapter (male to male), (1) Male RS-232 / 422 / 485 adapter, (1) female RS-232/422/485 adapter, (1) DB-9 to DB-9 female serial cable, and (1) 9V 1A power adapter.

AWB – S • Panel Mount RS-232 / 485 Transceiver w/ Accessories
AWB – U • Panel Mount USB w/ Accessories

Accessories

Power Options and Power Supplies

AW-SDP4-24-100T AW-SDP2-24-100T

AWT-BAT

AW-SDP2-24-100T • Class I Division 2, 50 Watt DC Power Supply
AW-SDP4-24-100T • Class I Division 2,100 Watt DC Power Supply

AWT-BAT • Replacement battery for battery powered transmitters, Size 'D' Lithium Battery (batteries individually sold)

Meriam Wireless

Antennas

Z7594-5

Z7594-1

Z7594-5 / AW-YAGI • AW-Yagi 4 Element Yagi Antenna with 8.1 dBi Gain (Includes mounting brackets)

Z7594-1 / AW-Omni • Omni Directional Antenna with 5.1 dBi Gain (Includes mounting brackets)

Recommended mating cables to connect dipole devices with Omni Directional & Yagi Antennas

RG58-RSP-NP-B	RG 58 RPSMA plug to Type N plug 12 inch cable
RG58-RSP-NP-C	RG 58 RPSMA plug to Type N plug 24 inch cable
RG58-RSP-NP-D	RG 58 RPSMA plug to Type N plug 60 inch cable
RG58-RSP-NP-E	RG 58 RPSMA plug to Type N plug 120 inch cable
RG58-RSP-NP-F	RG 58 RPSMA plug to Type N plug 240 inch cable

Z7594-2 / AW-CTB-800TF • Class I Division 1 Omni-Direction Antenna Dual Band 824-896 MHz & 1850-1990 MHz

Z7594-3 / AW-CTB-900TF • Class I Division 1 Omni-Direction Antenna 900MHz (For use with Adalet Wireless Systems Only)

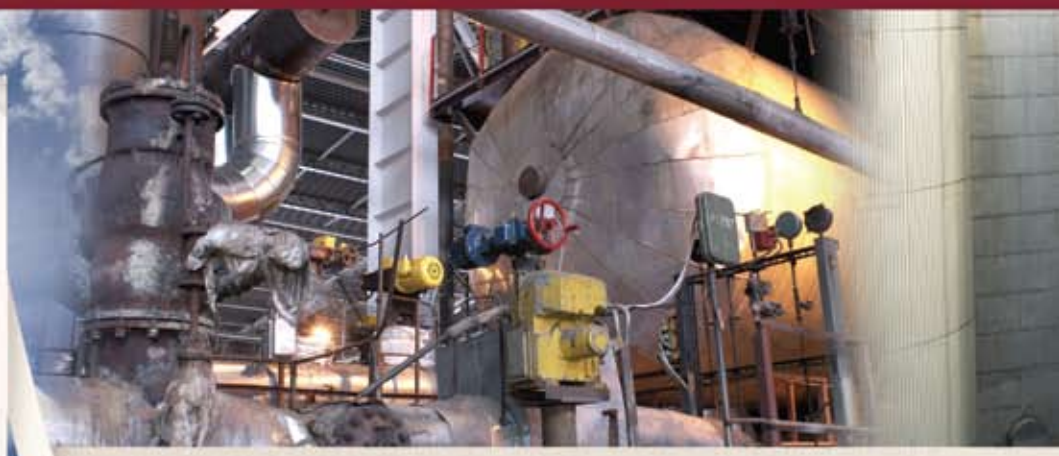
Recommended mating cables to connect dipole devices with 800 & 900 MHz Explosion Proof Antennas

RG174-RSP-TP-A	RG 174 RPSMA plug toTNC Type connector 6 inch cable
RG174-RSP-TP-B	RG 174 RPSMA plug toTNC Type connector 12 inch cable
RG174-RSP-TP-C	RG 174 RPSMA plug toTNC Type connector 24 inch cable
RG174-RSP-TP-D	RG 174 RPSMA plug toTNC Type connector 60 inch cable
RG174-RSP-TP-E	RG 174 RPSMA plug toTNC Type connector 120 inch cable
RG174-RSP-TP-F	RG 174 RPSMA plug toTNC Type connector 240 inch cable

Z7594-4 / AW-CTB-2400TF • Class I Division 1 Omni-Direction Antenna 2.4 GHz

Recommended mating cables to connect 2.4 GZ router with 2.4 GHz Antenna

RG58-RTP-RTP-A	RG 58 Reverse TNC Type Connector to Reverse TNC Type Connector 6 inch cable
RG58-RTP-RTP-B	RG 58 Reverse TNC Type Connector to Reverse TNC Type Connector 12 inch cable
RG58-RTP-RTP-C	RG 58 Reverse TNC Type Connector to Reverse TNC Type Connector 24 inch cable
RG58-RTP-RTP-D	RG 58 Reverse TNC Type Connector to Reverse TNC Type Connector 60 inch cable
RG58-RTP-RTP-E	RG 58 Reverse TNC Type Connector to Reverse TNC Type Connector 120 inch cable
RG58-RTP-RTP-F	RG 58 Reverse TNC Type Connector to Reverse TNC Type Connector 240 inch cable



Measurement Instrumentation

When it comes to gauges, whether mechanical or digital, The Standard is Meriam.[SM]

Mechanical gauges have been the reliable standard in pressure measurement. They still perform accurately and reliably. Since the introduction of our first electronic products some 20 years ago, Meriam Process Technologies has been a leader in the evolution of process pressure measurement science. During those 20 years, Meriam engineers have focused on the need to integrate electronic technology, advanced sensors and computer technology into the measurement of pressure and flow.

Meriam offers a wide variety of mechanical and digital pressure gauges for process measurement and indication. Terrific accuracy specifications and little-to-no temperature effect set these instruments apart from the competition. Many of our digital gauge products have multiple output options to increase their versatility in today's changing control schemes.

Count on Meriam to provide the pressure products that you need.

PICTURE. PERFECT. PRECISION.

The Meriam Process Technologies name and corporate identity reflect a dramatic evolution. Our latest calibration and communication products are helping Process Industry customers migrate from "Fail and Fix" to "Predict and Prevent" strategies.

2100 Series Smart Gauges

Meriam's 2100 Smart Gauges are microprocessor based pressure sensing devices that can be used to measure pressure, differential pressure (air or gas flow), or hydrostatic level. There are two models in the series: the 2110P is principally for pressure measurements and the 2110L is for level measurement.

Model 1500 Digital Pressure Transmitter

By utilizing RS-485 communications, Meriam's Model 1500 Digital Pressure Transmitter allows easy configuration using a laptop or PC computer. The 1500 Digital Pressure Transmitter is perfect for laminar flow systems, clean room pressure monitoring and many other applications.

MGF16BN Digital Pressure Gauges

The MGF16BN Series Gauge from Meriam comes in a standard accuracy of ±0.25% FS and an optional accuracy of ±0.1% FS.

The wetted parts are 316L stainless steel – ideal for most liquids and gases. The MGF16BN's process connection is a standard ¼" MNPT fitting.

The MGF16BN is powered by only 2 AA alkaline batteries – giving the user approximately 2,000 hours of battery life. Every gauge comes standard with a NEMA 4X ABS polycarbonate enclosure.

Bellows Gauges For Differential Pressure, Flow & Level

The Bellows D/P line of instruments serves as a complement to manometers by offering a choice when pressure rating, size, process compatibility and other specifications are a factor. Meriam offers indicators and indicating switches to meet many process application needs. Pressure ranges are available 30" H_20 to 500 PSID and safe working pressures from 500 PSI to 6000 PSI.

Model 1020 Differential Pressure Unit

The Model 1020 Differential Pressure Unit is lightweight and compact – perfect for applications where size and weight are critical factors. Suited for activating indicators, recorders, transmitters, switches and controllers, this differential pressure unit incorporates a rupture-proof and leak-proof bellows plus other construction features that make it second-to-none. The Bellows D/P assemblies are used by many instrument manufacturers as the basic differential pressure sensing devices for indicators, recorders, transmitters or controllers.

CUSTOMER TESTIMONIAL

I am currently using Meriam's MGF16BN Pressure Gauge - and I couldn't be happier with the product. Our old pressure gauge couldn't stand up to the abuse our environment and workers put it through. Meriam's gauge is housed in a polycarbonate NEMA 4X enclosure - perfect for all the abuse it is subjected to. I also like the fact the engineering units are available through the front keypad so we don't have to remove all the screws to the front cover just to change the units from PSI to Inches of Water. The low price and high accuracy made our purchase an easy decision.

- Supervisor, Electrical Shop

2110P

Smart Pressure Gauge

Meriam Instrument's 2110P Smart Gauge is a microprocessor based, programmable pressure sensing device. The various ranges available allow for measurement of pressure, vacuum and absolute pressure. All units are programmed to allow easy configuration of the gauge through the front keypad. The AC powered and 4-20 mA units can also be configured through the RS-232C serial communications port.

SPDT relays on AC powered units and the 4-20 mA output on the transmitter models make the 2110P an ideal choice for many control and recording functions. Both models also have RS-232C communications for additional control and data logging capabilities. Typical applications include use as a test bench gauge, tank level measurement, gas flow measurement and leak testing.

2110P Smart Pressure Gauge Advantages

- Measures gauge, vacuum and absolute pressure
- Accuracy of 0.05% full scale
- Ranges for 20 PSI to 2000 PSI
- 4½ digit display
- RS-232C, 4-20 mA and relay outputs

2110P

Smart Pressure Gauge

Ordering Information

Model
2110P Smart Pressure Gauge

Sensor Type and Range

GI0020	0-20 PSI	Gauge
GI0200	0-200 PSI	Gauge
GI2000	0-2000 PSI	Gauge
AI2000	0-2000mm Hg	Absolute

Mounting Options

01	Panel Mount
02	2" Pipe Mount
03	Portable Handle/Bench Stand

Power/Output Options

1	110/220 VAC, 24 VDC/RS-232C, and SPDT Relays
2	Batteries / No Outputs
3	24 VDC /4-20 mA, RS-232C

CSA Intrinsically Safe and CE MARK available on select models. Contact factory for details.

Features

- Backlight
- Damping - Selectable from 0.1 to 50 seconds
- Adjustable Deadband - On SPDT relays
- Selectable Timeout - Conserves battery
- Selection of Engineering Units - mm Hg, PSI, in. Hg, mbar. Bar, kPa, in H_2O (@20ºC, 4ºC, or 60ºF), Kg/cm^2, cm. H_2O and user defined.
- Lockout - Prevents inadvertent resetting of gauge configuration.

Specifications

Sensor Type & Range	GI: Gauge Isolated AI: Absolute Isolated	20, 200, 2000 PSIG 0-2000 mm Hg Abs 0-900 mm Hg Abs
Temperature	Storage: -40°F to 140°F (-40°C to 60°C) Operating: -23°F to 122°F (-5°C to 50°C)	
Pressure Limits	Twice the range on AI and GI units.	
Display	4½ digit LCD, 0.6" high (15.24mm)	
Power/Outputs	Standard unit has selectable 110 VAC 50/60 Hz, 220 VAC 50/60 Hz, or 12 to 28 VDC power. Included are an RS-232C and two set point relays rated 1 amp resistive @ 24 VDC, .5 amp resistive @ 115 VAC.	
Options	Lithium battery unit with field replaceable battery board and user defined auto shut-off. No outputs or 4-20 mA output unit with 12 to 28 VDC power and RS-232C.	
NIST Traceable Accuracy	± 0.05% FS. (this includes the combined effects of linearity, repeatability, hysteresis and temperature). **NIST certification supplied.**	
Media Compatibility	Isolated AI and GI sensors for fluids compatible with 316SS.	
Enclosure	4 lbs. ¼ DIN (3.8" x 3.8" x 6.5") aluminum enclosure with epoxy finish. Standard unit is NEMA 4X on front panel only. Battery and 4-20 mA units are NEMA 4X throughout.	

2110L

Smart Level Gauge

Meriam Instrument's 2110L Smart Gauge is a microprocessor based, programmable, pressure sensing device. It is designed to display tank level in volumetric or mass units based on the hydrostatic head pressure of the fluid in the tank. The 2110L can be used in bubbler systems or for direct head measurement on pressurized or vented tanks. It can be configured for linear tanks such as vertical cylinders or for use on non-linear tanks such as horizontal cylinders and spheres. All units are programmed to allow easy configuration of the gauge through the front keypad. The AC powered and 4-20 mA units can also be configured through the RS-232C serial communications port.

SPDT relays on AC powered units and the 4-20 mA output on the transmitter models make the 2110L an ideal choice for many level control and recording functions. Both models also have RS-232C communications for additional control and data logging capabilities. The SPDT relays have selectable deadbands to prevent wear on pumps due to constant cycling.

2110L Smart Level Gauge Advantages

- Measures in linear and non-linear tanks
- Accuracy of 0.05% full scale
- Ranges for 20 PSI
- 4½ digit display
- RS-232C, 4-20 mA communications
- SPDT relay outputs with selectable deadband

2110L

Smart Level Gauge

Ordering Information

Model
2110L Smart Level Gauge

Sensor Type and Range
GI0020 0-20 PSI Gauge

Mounting Options
01 Panel Mount
02 2" Pipe Mount
03 Portable Handle/Bench Stand

Power/Output Options
1 110/220 VAC, 24 VDC with RS-232C, and SPDT Relays
2 Batteries / No Outputs
3 24 VDC /4-20 mA, RS-232C

Features

- Backlight
- Damping - selectable from 0.1 to 50 seconds.
- Adjustable Deadband - on SPDT relays
- Selectable Timeout - conserves battery
- Selection of Engineering Units - Gallons, Liters, Cubic Meters, Cubic Feet, Kilograms, Pounds, percent full, inches of water and user defined. Minutes and hours time constants can be displayed.
- Lockout - prevents inadvertent resetting of gauge

Specifications	
Sensor Type & Range	GI: Gauge Isolated 20 PSIG
Temperature	Storage: -40°F to 140°F (-40°C to 60°C) Operating: -4°F to 122°F (-20°C to 50°C)
Pressure Limits	Twice range on GI.
Display	4½ digit LCD, 0.6" high (15.24mm)
Power/Outputs	Standard has selectable 110 VAC 50/60 Hz, 220 VAC 50/60 Hz, or 12 to 28 VDC power. Included are an RS-232C and two SPDT relays rated 1 amp resistive @ 24 VDC, .5 amp resistive @ 115 VAC.
Options	Lithium battery unit with field replaceable battery board and user defined auto shut-off. No outputs. **-OR-** 4-20 mA output unit with 12 to 28 VDC power and RS-232C.
NIST Traceable Accuracy	± 0.05% FS (this includes the combined effects of linearity, repeatability, hysteresis and temperature). **NIST certification supplied.**
Media Compatibility	Isolated GI sensor for fluids compatible with 316SS.
Process Connection	⅛" female NPT, 316SS
Enclosure	4 lbs. ¼ DIN (3.8" x 3.8" x 6.5") aluminum enclosure with epoxy finish. Standard unit is NEMA 4X on front panel only. Battery and 4-20 mA units are NEMA 4X throughout.

Model 1500

Digital Pressure Transmitter

Meriam's Digital Pressure Transmitters are for high accuracy applications at OEMs, on manufacturing skids, in process control systems and plant instrumentation. RS-485 communications allow for easy configuration using a PC or laptop computer. The RS-485 addressable interface allows up to 32 devices to be networked together. Optional 1-5 Volt, 0-5 Volt or 4-20 mA outputs are also configured from a PC or laptop.

- ± 0.025% of URL (Upper Range Limit)
- Absolute and gauge pressure sensors
- 316SS isolated sensors for wet/corrosive process
- No temperature effect on RS-485 output from 23°F to 122°F (-5°C to 50°C)

Model 1500 Advantages

- No temperature effect on digital accuracy over temperature range
- ±0.025% URL accuracy
- RS-485 digital communications with 4-20 mA, 0-5 volt or 1-5 volt options
- Analog and digital outputs can be used simultaneously
- Ranges from 20" H_2O to 2000 PSIG

Model 1500

Digital Pressure Transmitter

RS-485 Programming

- Pressure zero set
- Reset factory zero
- Analog output span and offset factor set
- Damping factor set
- Engineering units selection
- Multi drop address selection

Accessories

- DB-9 connector pigtails
- RS-485 to RS-232 interface devices
- Process connection adapters
- Electrical connection adapters
- System setup software

Application Examples

- Laminar Flow Systems
- Clean room pressure monitoring
- Tank level measurement

Accuracy

RS-485 ±0.025% of URL (±0.1% 20" sensor)
±0.1% span @ 4:1 turndown of URL
±0.25% span @ 10:1 turndown of URL

4-20 mA ±0.05% of URL (±0.1% on 20" sensor)
±0.125% span @ 4:1 turndown of URL

1 to 5 VDC & 0 to 5 VDC
±0.05% of URL (±0.1% on 20" sensor)
±0.125% span @ 4:1 turndown of URL

Output Options

RS-485 (standard): Half Duplex, 3 wire- TR-1, TR-0, Signal ground. 9600 baud, 1 start bit, 1 stop bit and no parity. External power of 6 to 30 VDC (100 mA max). Multi-drop addressing with up to 32 devices maximum per RS-485 segment. RS-485 repeaters for additional segments.

4-20 mA (optional): 2 wire current loop. 17 to 30 VDC for loop supplied 4-20 mA.

1-5 V or 0-5 V (optional): 4 wire, 17 to 30 VDC. Digital communications and analog outputs can be used simultaneously.

Ordering Information

GI0020	0-20 PSI	Gauge
GI0200	0-200 PSI	Gauge
GI2000	0-2000 PSI	Gauge
AI2000	0-2000 mm Hg	Absolute
AI0900	0-900 mm Hg	Absolute

Specifications		
Models/Ranges	GI: Gauge isolated AI: Absolute isolated	20, 200, 2000 PSIG 900 mm Hg, 2000 mm Hg
Temperature Effect	No temperature effect from -5°C to 50°C using RS-485 output. Analog output ± .005% of span/°C.	
Long Term Stability	± 0.1% URL per year	
Temperature Range	Storage: -40°F to 140°F (-40°C to 60°C) Operating: 23°F to 122°F (-5°C to 50°C)	
Pressure Limits	Twice the range on GI and AI units.	
Connections	Pressure: ⅛" FNPT Digital: DB-9 Analog: 2 pc. Terminal Block	
Media Compatibility	Isolated AI and GI sensors for use with fluids compatible with 316SS.	
Weight	GI, AI 2 pounds	
Enclosure	2.2" x 4.2" x 4.5" NEMA 12	
Mounting	Surface/wall mounting, 2" pipe and DIN rail options available.	
Engineering Units	cm WC, in WC (at 39.2°F, 60°F and 68°F), mBar, Bar, mm Hg, in Hg at 0°C, PSI, kPa, Kg/cm^2.	
Damping	0.1 to 25 seconds.	

MGF16BN

Battery-Powered Digital Pressure Gauges

The Meriam Instrument MGF16BN digital pressure gauge successfully addresses the modern demands of process pressure measurement. Pressure ranges are available to 5,000 PSIG at standard accuracy of ±0.25% of full scale and optional accuracy of ±0.1% of full scale. Compound gauges that can be used for positive pressure measurements and vacuum measurements are also available.

The display is a 4½ digit LCD with 0.5" high numerals and a lower alphanumeric display for engineering units and to aid in set up. Each gauge includes up to 15 field selectable engineering units depending on the sensor range. The selectable units include PSIG, kiloPascals, megaPascals, millibar, bar, atmospheres, kilograms per square centimeter, grams per square centimeter, centimeters of water, ounces per square inch, feet of water, inches of water, millimeters of mercury, Torr, and inches of mercury.

Other standard features include min/max capture, zeroing, pass code program lock-out, adjustable display shutoff time and field recalibration. The housing is ABS/polycarbonate and is NEMA 4X rated. Wetted components are 316L stainless steel for compatibility with many process fluids. Process connection is via a ¼" MNPT 316L stainless steel fitting. The gauge is powered by two AA alkaline batteries.

Typical applications are instrumentation and control in the process industries, hydraulics, pneumatics, industrial gases and OEM's.

MGF16BN Advantages

- ±0.25% Test Gauge Accuracy (optional ±0.1% available)
- 316L Stainless Steel Wetted Parts
- NEMA 4X
- Capture Minimum and Maximum Readings
- Push Button Zero
- 15 Selectable Engineering Units
- Selectable Auto Shutoff Times

MGF16BN

Battery-Powered Digital Pressure Gauges

MGF16BN Standard Features

Overpressure

3000 PSIG Range: 5000 PSIG
5000 PSIG Range: 7500 PSIG
All Others: 2x Pressure Range
112.5% FS
out-of-range display: /--- or/-.-.-.- depending on model

Environmental

Storage Temperature: -40ºF to 203ºF (-40ºC to 95ºC)
Operating Temperature: -4ºF to 185ºF (-20ºC to 85ºC)
Compensated Temperature: 32ºF to 158ºF (0ºC to 70ºC)

MVP-600KT Combo Pneumatic Calibration Pump Ordering Information (optional)

P/N	Model	Description
Z1066-7	MVP-600KT	Pump, case, (1) hose with fittings for use with top mounted MGF16BN Gauge
Z1066-6	MVP-600	Pressure/Vacuum Calibration Pump 600 PSI / 40 bar
Z1066-8	HK-600	(1) 2 ft. hose with fittings
Z1066-9	HK-TS	MVP-600 (2) hoses (top & side) with fittings

Specifications

- Pneumatic combination pump: vacuum 28" Hg to pressure 600 PSI
- Push for Vacuum / Push for Pressure valve
- Oversized check valve for smooth, controlled operation
- Vent Valve
- Connections: (2 ports) ¼" and ⅛" NPT / BSP
- Weight: 2 lbs.

Pictured with optional pump

Ordering Information

±0.25% FS Models	Pressure Ranges
MGF16BN-30V15PSIG	-30.0 inHg to 15.0 PSIG
MGF16BN-30V100PSIG	-30.0 inHg to 100.0 PSIG
MGF16BN-30V200PSIG	-30.0 inHg to 200.0 PSIG
MGF16BN5PSIG	0 to 5.000 PSIG
MGF16BN15PSIG	0 to 15.00 PSIG
MGF16BN60PSIG	0 to 60.00 PSIG
MGF16BN100PSIG	0 to 100.0 PSIG
MGF16BN200PSIG	0 to 200.0 PSIG
MGF16BN300PSIG	0 to 300.0 PSIG
MGF16BN500PSIG	0 to 500.0 PSIG
MGF16BN1000PSIG	0 to 1000 PSIG
MGF16BN2000PSIG	0 to 2000 PSIG
MGF16BN3000PSIG	0 to 3000 PSIG
MGF16BN5000PSIG	0 to 5000 PSIG

Consult factory for other available ranges.

Specifications

Accuracy	Standard: ± 0.25% of Full Scale ±1 least significant digit includes linearity, hysteresis, repeatability Optional: HA ± 0.1% FS ±1 LSD NC NIST traceable test report and calibration data
Display	3 readings per second nominal display update rate 4½ digit LCD, 0.5" H, 5 character 0.25" H alphanumeric lower display
Controls & Functions	Front buttons turn gauge on or off, zero gauge, cycle through min/max functions, select engineering units, select auto shutoff times, and are used for calibration functions
Calibration	Pass code protected calibration Non-interactive zero, span, and linearity, ±10% of range
Automatic Shutoff	5 minute default; User selectable times ranging from 1 minute to 8 hours or front button on/off
Power	2 AA alkaline batteries Approximately 2000 hours battery life Low battery symbol on display when batteries must be replaced
Weight	9 ounces
Material	ABS/polycarbonate NEMA 4X case, rear gasket, polycarbonate label
Connection Size	¼" NPT male, 316L SS
Burst Pressure	4 times sensor pressure rating, or 10,000 psi, whichever is less

MH-10KT

Hand Pump Series

Hydraulic & Pneumatic Calibration Pumps

Meriam's hand pumps can be used with a variety of products such as our MGF16BN gauges, manometers, Model 35EE Meri-Cal, MFT Series, M2 Series Smart Manometers and the M1 Series Digital Manometers/Calibrators.

MH-10KT Hydraulic Calibration Pump

The Meriam Calibration Pump MH-10KT uses a fully adjustable stroke control to allow for fast priming or filling of test systems. This gives the operator the ability to switch as needed to a smaller stroke for easier pumping at high pressure.

Features

- Contoured cushion handles
- Patented protective cage around vent knob
- Priming feature
- Patented triple filtration (prevents pump failure caused by dirt)
- A non-oil based lubricant is used on all moving parts
- Built in pressure relief valve (prevents over pressurizing)
- Shatter proof reservoir
- Oversized check valves for smooth controlled operation
- 2 year warranty (includes dropping)
- Includes: black padded canvas case, 3ft high pressure hose, fittings, adaptors, test point and (3) spare filters

Specifications	
Specifications	0 - 10,000 psi (700 Bar) Compatible with most hydraulic fluids, oils and water Connections (2 ports) 1/4 inch NPT / BSP Weight 3lbs Made in the USA
Additional Information	The Meriam Calibration Pump MH10KT uses a fully adjustable stroke control to allow for fast priming or filling of test systems. This gives the operator the ability to switch as needed to a smaller stroke for easier pumping at high pressures.
Options	Model# M-10FW Additional spare filters (3) and (2) spare rubber bonded washers. MGFIG, 4 ½" digit LCD gauge, battery operated, pipe mount via ¼" MNPT 316 stainless steel stem, NEMA 4 rated housing, ranges 0 to 5000 PSIG. Please visit our website for more information. Note: Kits, hoses and fittings can be customized upon request.

Hand Pump Series

Hydraulic & Pneumatic Calibration Pumps

MP-100KT

MP-100KT Calibration Pump

Features

- Delrin plastic handle prevents body heat transfer
- Oversized check valves for smooth controlled operation
- Mash proof vent valve (No Needle Valve)
- A patented non-oil based lubricant is used on all moving parts
- Dual O-Rings on all pistons to ensure zero leakage
- 2 year warranty (includes dropping)
- Includes: A black padded canvas case, 2ft non-stretch hose, fittings and stainless steel analog gauge 2 ½" w/ protective rubber boot.

Specifications	
Specifications	MV-100 0-28"Hg (depends on barometric pressure) MP-100 0 to 100 psi (including and not limited to an inch of water) Connections (2 ports) ⅛" NPT Weight 1.5 lbs 2ft hose and ¼" fitting Made in the USA
Options	Meriam MGF16BN Digital Pressure Gauge, battery operated, pipe mount via ¼" MNPT 316 stainless steel stem, NEMA 4 rated housing, ranges 0 to 5000 PSIG. Please visit our website for more information.

M-600KT

M-600KT Combo Pneumatic Calibration

Features

- Contoured cushion handles
- Oversized check valves for smooth controlled operation
- Mash proof vent valve (No Needle Valve)
- A patented non-oil based lubricant is used on all moving parts
- Dual O-Rings on all pistons to ensure zero leakage
- 2 year warranty (includes dropping)
- Includes: A black padded canvas case, 2ft non-stretch hose, fittings and Meriam stainless steel analog gauge 2 ½" w/ protective rubber boot.

Specifications	
Specifications	Vacuum 28" Hg to pressure 600psi (combination pump) Compatible with all gauges and calibrators Connections (2 ports) ¼" and ⅛" NPT/BSP Weight 2 lbs Made in the USA
Options	MGFIG, 4½" digit LCD gauge, battery operated, pipe mount via ¼" MNPT 316 stainless steel stem, NEMA 4 rated housing, ranges 0 to 5000 PSIG. Please visit our website for more information.

1120 Series Indicators
Indicator models 1123, 1124 and 1126 have 3", 4½" and 6" dials respectively. A variety of scales for differential pressure, flow and level can be supplied. The 1120 Series is widely used in industrial process plants, power plants, pollution control facilities and in the cryogenic gas industry.

1220 Series Indicating Switches
The Series 1220 Differential Pressure Indicating Switches are used for on-off control or alarm. They also indicate flow, liquid level or other process variables. These units are furnished with one or two SPDT type switches with actuation set points easily adjustable over most of the range of the instrument. The calibrated travel of the pointer is 270° which gives good differential pressure indication and switch resolution. Dials can be supplied with linear scales for differential pressure, square root scales for flow, or custom scales for level. The Series 1220 Switches are used extensively in power plants, compressor stations and cryogenic applications.

1226X Explosion-Proof Switch
Meriam's 1226X Explosion-Proof Indicating Switch is CSA and U.L. listed, meeting N.E.C. requirements for Class I, Division I, Group D hazardous environments. Class I, Group D atmospheres include gasoline, hexane, naphtha, benzine, butane, propane, alcohol, acetone, benzol, lacquer, solvent vapors, and natural gas.

The explosion-proof housing is made from a strong, light-weight aluminum alloy that is both non-rusting and non-sparking. A large glass window provides full viewing of the 6" indicator. Front of board, panel or pipe mounting can be supplied.

1126P-2 Portable Indicator
The 1126P-2 is designed for portable applications. Typical examples are periodic measurements of the pressure drop across filters, balancing of flow rates in heating and cooling systems and checking of back flow prevention devices. Meriam's 1126P-2 consists of an 1126 D/P Indicator with 3-valve manifold and piping, 2 hoses and quick disconnects. Each instrument system is assembled as a complete package with all the accessories mounted in a rugged, light weight case. When used as a flow measuring device, the instrument normally comes with a 0-100% square root scale. With all flow elements designed for the same differential, multiplying the scale reading by the primary element's full flow design value gives readings directly in flow units. Scales in flow units, inches of H_20, PSI and metric units are also available.

Bellows Gauges

for Differential Pressure, Flow and Level

The Meriam Model 1120 Differential Pressure Unit is a proven and reliable sensing element used in all Meriam Bellows Gauges. It is available in ranges as low as 0-30" w.c. or as high as 0-500 PSI. The light weight and compact differential pressure unit incorporates a rupture-proof and leak-proof bellows plus other features that ensure ruggedness and reliability. This basic unit is suitable for activating indicators, recorders, transmitters, switches, and controllers and is available as a separate assembly for that purpose.

The 1120 consists of a high and a low pressure bellows connected to each side of a center plate. The bellows are enclosed in end housings which in turn are bolted to the center plate. The interior of the bellows and center plate is completely filled with a clean, low freezing point, non-corrosive fill fluid. As differential pressure is applied, this fill fluid moves between the bellows through a field adjustable dampening valve in the center plate. Other external dampening devices are not required for measurements of pulsating differential pressure. Also, the Meriam 1120 incorporates a special design which completely isolates the process fluid from the center plate.

When differential pressure is applied to the high and low pressure connections, the high pressure bellows contracts, forcing fluid through the center plate into the low pressure bellows which expands. The resulting linear motion of the low pressure bellows is converted to a 6° rotary motion of the output shaft through temperature compensating linkage. Over-range protection up to the pressure rating of the housing is provided by two fluid shut off valves located on this linkage. The output shaft is part of a low friction, "O" ring sealed shaft and bearing assembly which carries the rotary motion to the external area of the bellows unit and into the instrument case.

Bellows Gauges

for Differential Pressure, Flow and Level

Features

1020 & 1120 Accuracy

30" w.c. range	1.50% FS
50" w.c. thru 500 PSID range	0.75% FS
Option: 100" w.c. thru 50 PSID range	0.50% FS

1220 Accuracy

Before switch activation	0.75% FS
At switch activation point	2.00% FS
After switch activation	1.50% FS

Zero Elevation
100% of range (150 PSID maximum)

Suppression
15% of range with 270° pointer travel

Operating Temperature
-60°F to +200°F

Full Scale Displacement

30" w.c. thru 130" w.c. range	.19 Cu. In.
135" w.c. thru 60 PSID range	.12 Cu. In.
75 PSID thru 500 PSID range	.06 Cu. In.

1220 Switch Type
Snap action SPDT

1220 Switch Setting Accuracy
1.00% FS

1220 Dead Band

1 switch (nominal)	7% FS
2 switch (nominal)	10% FS

1220 Switch Setting
Increasing -10 to 100% of differential or 10" of water whichever is greater
Decreasing - 5% or 5" of water whichever is greater
Between set points -15% of FS minimum

1220 Switch Rating
5 amps at 125V or 250V AC
3 amps inductive or 5 amps resistive at 30VDC

Mounting Dimensions

Model 1020	Request File No. 1020:420
Model 1123	Request File No. 1123:420
Model 1124	Request File No. 1124:420
Model 1126	Request File No. 1126:420
Model 1224	Request File No. 1224:420
Model 1226	Request File No. 1226:420
Model 1226X-1	Request File No. 1226X-1:420
Model 1226X-2	Request File No. 1226X-2:420

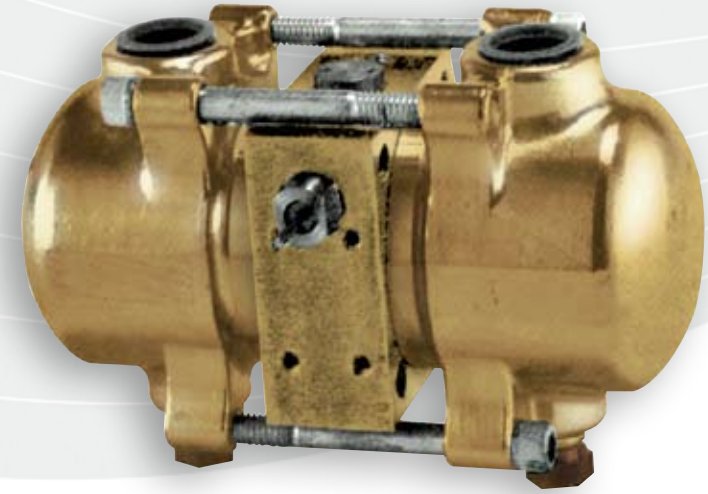
Ordering Information

To order any one of Meriam's Bellows Gauges, custom-made to your specifications, please contact your Meriam sales representatives with the following information:

- Model Number
- Housing Material
- Safe Working Pressure
- Bellows Material
- Differential Range
- Type of Scale (Linear or Sq. Rt.)
- Type of Mounting

Specifications

Model	1020	1123	1124	1126	1224	1226	1226X	1126P-2
Dial Size	No Dial	3"	4½"	6"	4½"	6"	6"	6"
Housing	**End Housing**	**Center Plate**			**Static Working Pressure**		**Process Connections**	
	Brass	Brass			500 or 1000 PSI		¼" NPT	
	316 SS	316 SS or Brass (500 SWP Only)			1500, 3000 or 6000PSI		¼" & ½" NPT	
	Monel	316 SS			1500, 3000 or 6000PSI		¼" & ½" NPT	
Bellows	Beryllium Copper (30" w.c. Minimum—60 PSID Maximum)							
	316 Stainless Steel (50" w.c. Minimum—500 PSID Maximum)							
	Monel (50" w.c. Minimum—60 PSID Maximum)							
Mounting (Except 1126P)	Flush Panel using indicator case for mounting							
	Wall or ¾" NPT using universal mounting bracket							
	Pipe Saddle or Wall using "H" mounting Bracket and 2" U-Bolts							
Features	Special scales and ranges available				Optional bellows fill fluid			
	Simple zero, span and linearity adjustment				Additional relay options available for 1220 Series			
	Temperature compensation for varying ambients				270" pointer travel; red set pointer			
	Break-resistant acrylic viewing window				Valves and Piping			
	NEMA 4, Die-cast aluminum case with gasketed cover				Special cleaning for oxygen service			
	Low friction "O" ring sealed shaft output				Option for meeting NACE MR-01-75 requirements			
	Optional anti-parallax mirror dial				Terminal Strip			
	CE approval for 1120 and 1220 Series (option)				Built-in pulsation dampening (field adjustable)			
	CSA approved 1226 Models							



Model 1020

Differential Pressure Unit

The Meriam Model 1020 Differential Pressure Unit is a proven and reliable sensing element. Available in ranges from as low as 0-30" H_2O to 0-500 PSI. It is especially adaptable where size and weight are critical factors. The light weight and compact differential pressure unit incorporates a rupture-proof and leak-proof bellows plus other construction features that make it second to none. This unit is suitable for activating indicators, recorders, transmitters, switches and controllers and is available as a separate assembly for that purpose.

The basic D/P unit consists of a high and a low pressure bellows, both liquid filled and connected to a center plate. The bellows are enclosed in the high and low pressure end housings which in turn are bolted to the center plate. When differential pressures are applied to the high and low pressure connections, the high pressure bellows contracts forcing the fill fluid through the center plate into the low pressure bellows causing it to expand.

The resulting linear motion of the low pressure bellows is converted to a 6° rotary motion of the output shaft through a temperature compensated linkage. Over-range protection is provided by two opposed valves located on this linkage allowing the unit to withstand over-ranging up to the full static pressure rating of the housing without damage. The interior of the bellows and center plate are completely filled with a clean, non-corrosive, low freezing point liquid. This output shaft is part of a low friction, "O" ring sealed shaft and bearing assembly which carries the rotary motion to the external area of the bellows unit and into the instrument case.

In the Meriam bellows unit all of the fill fluid must pass through the Meriam Pulsation Dampening valve in the center plate. This valve is field adjustable so that the desired dampening effect can be obtained. Because of this Meriam design, other types of external dampening devices are not required on services involving measurement of fluctuating differential pressures. The Meriam bellows D/P unit incorporates a special design which completely isolates the process fluid from the center plate.

Model 1020 Features

- Range variations
- Material variations, housing, bellows and center plate
- Rugged construction for long life
- 6° output shaft rotation
- Temperature compensation for varying ambient conditions
- Integral field adjustable pulsation dampening
- Low friction "O" ring sealed output shaft
- Over-range protection - high and low pressure
- Seamless leak-free bellows
- Process isolation rings

Model 1020

Differential Pressure Unit

Standard Ranges (1)

In. of H_2O	Cm. of H_2O	PSI	Kg. per Sq. Cm.
0-30" (2)			
0-50" 0-200"	0-125 0-500	0-10 0-150	0-0.7 0-10.5
0-60" 0-250"	0-150 0-635	0-15 0-200	0-1.05 0-14.0
0-80" 0-300"	0-200 0-760	0-20 0-250	0-1.4 0-17.0
0-100" 0-350"	0-250 0-890	0-25 0-300	0-1.75 0-21.0
0-150"	0-380	0-50 0-350	0-3.5 0-25.0
		0-100 0-400	0-7.0 0-28.0
		0-500	0-35.0

(1) Split range and center zero available
(2) Available only with Berylium Copper Bellows

Construction Specifications

Housing Material	Process Connections	Pr. Rating PSIG	Wt.
Brass	1 pr. ¼" NPT and 1 pr. ½" NPT	500	6¼ lbs.
Stainless Steel Type 316	1 pr. ¼" NPT and 1 pr. ½" NPT	1500 / 3000 / 6000	6¼ lbs. / 15Lb.
Monel-400	1 pr. ¼" NPT and 1 pr. ½" NPT	1500 / 3000 / 6000	6¼ lbs. / 15Lb.
Bellows Material	Berylium Copper Stainless Steel Type 316L, Monel-400		

(1) Available with Brass Centerplate @ 500 SWP.

Notes:
1) Process connections available
Brass ¼" NPT
SS & Monel ½"NPT
top, ¼" NPT bottom
2) 6000 PSIG SWP housing dimensions not shown

Performance Specifications

Independent
0 to 30" W.C. range ±1.50% FS

Linearity
0 to 50" W.C. thru 0 to 500 PSID range ±0.75% FS

Temperature Limits
-60°F to +200°F

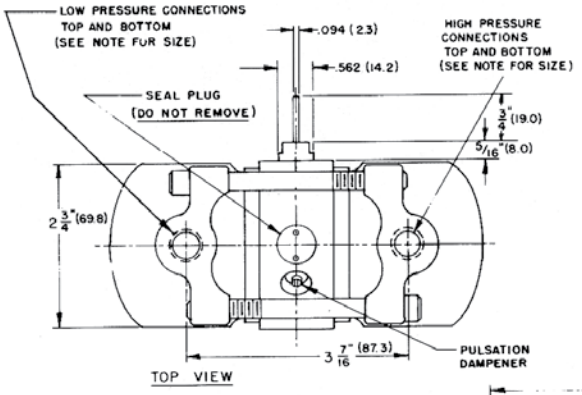
Full Scale Displacement

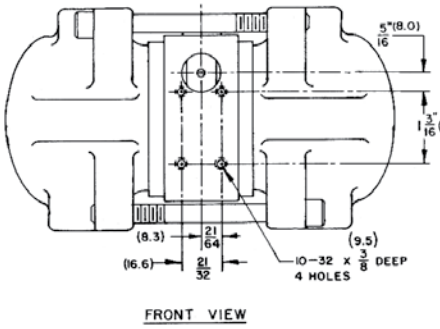
0 to 30" thru 0 to 130" W.C. range	.19 Cu. In.
0 to 130" W.C. thru 0 to 60 PSID range	.12 Cu. In.
0 to 75 PSID thru 0 to 500 PSID range	.06 Cu. In.

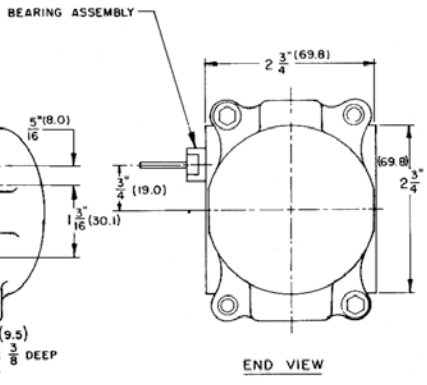
Ordering Information

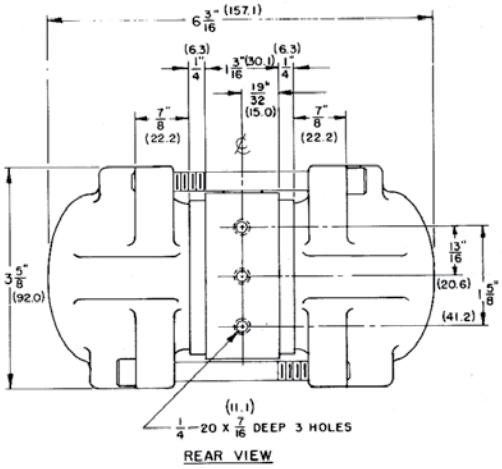
To order Meriam's Model 1020 Differential Pressure Unit, custom-made to your specifications, please contact your Meriam sales representatives with the following information:

- Model Number
- Housing Material
- Safe Working Pressure
- Bellows Material
- Differential Range









Meriam's Manometer Line

Meriam Manometers have many advantages in this age of technology because of their inherent accuracy and simplicity. Manometers are unique in being both pressure measurement instruments and standards for calibration of other instruments. The manometer is commonly used to measure pressures ranging from as high as 100 inches of 2.95 Red Fluid (10.65 PSI) to the lowest vacuums of space.

PICTURE. PERFECT. PRECISION.

First invented in the seventeenth century, manometers are used to measure the pressure of gases. During the 1600s, scientists tried to explain natural phenomena in logical, rational ways, instead of relying on mystical or magical explanations. At this time, most people, including the great scientist Galileo, believed water pumps demonstrated the commonly held theory that nature abhors a vacuum, but because they were unaware that air and other gases exert pressure, they could not explain why a pump could not raise water more than 32 ft (9.7 m).

In 1643, Italian physicist Evangelista Torricelli tried to explain this phenomenon. In his experiments, Torricelli used a vertical tube filled with mercury to measure air pressure, and in doing so, he created the first mercury barometer, proving that air has weight and exerts pressure on all objects and substances on Earth. Soon afterward, British chemist Robert Boyle used a mercury barometer to determine the relationship between the pressure of air and its volume. In these experiments both Torricelli and Boyle used rudimentary versions of the manometer.

U-Tube Manometer

The U-tube manometer is the basic and most widely used style of manometer. The Meriam U-tube manometer is a versatile, economical instrument for the measurement of pressures, vacuums or differential pressures. Pressure measurements are accomplished by balancing a vertical head of indicating fluid with the pressure to be measured. There are no cams, gears, or levers to operate in the manometer. This allows the U-tube manometer to be recognized by NIST as a primary standard due to its inherent accuracy and simplicity of operation. Meriam U-tube manometers are constructed of a ridged cast aluminum frame, aluminum indicating scale and hand bent glass U-tube. Mounting holes are provided in the frame for mounting to a wall, column or other suitable structure.

Well Type Manometer

Well manometers are a direct reading device designed for process monitoring, general purpose production testing or laboratory measurement. Designed for a maximum line pressure of 250 PSI (500 PSI optional) these instruments may also be used for tank level, flow measurement and leak detection. Well manometers are constructed of aluminum channel, stainless steel end blocks and stainless steel manometer well. The 7/16" diameter glass tubing is yoke packed with viton gaskets at each end block and is supported at spaced intervals to prevent distortion. In most cases, the uncertainty of a manometer reading is +½ of the smallest scale graduation. This is due to the human eye's ability to interpolate between graduations.

Inclined Manometer

Inclined manometers provide greater readability by stretching a vertical differential along an inclined indicating column, giving more graduations per unit of vertical height. This effectively increases the instrument's sensitivity and accuracy. Scales are typically graduated to the hundredth of an inch. The Model 40HEX Inclined manometer is individually calibrated and the angle of inclination is set relative to the instrument level mounted above the channel. The unit is also capable of operating with 350-PSI line pressure. The construction of the 40HEX35 is similar to the well type manometer described above. Additional inclined manometers are available depending on your requirements. Please review the manometer chart on the facing page or contact the factory for assistance.

DON'T FORGET TO ACCESSORIZE! MERIAM OFFERS INDICATING FLUIDS AND ACCESSORIES FOR OUR MANOMETER LINE. BE SURE TO ASK YOUR MERIAM REPRESENTATIVE FOR MORE INFORMATION WHEN PLACING YOUR ORDER.
SEE PAGES 80-81.

Meriam Manometers Quick Selection Chart

MODEL	RANGES (In Inches)	WETTED PARTS	PRESSURE RATING	MOUNTING STYLES
"U" Tube 10AA25	6, 10, 15, 20, 30, 50	Cast Iron 316 SS PVC	250 PSIG	Wall Table
Hi Pressure "U" Tube 20DAX40	10, 20, 30, 40, 60, 80, 100	303 SS	400PSIG	Wall Table
General Purpose 30EBX25 30EBX50	6, 12, 20, 30, 35, 40, 50, 60, 80, 100	303 SS	250 PSIG 500 PSIG	Wall, Table Flush Front Pipe
Precision Vernier 30EFX25	20, 30, 40, 50, 60	303 SS	250 PSIG	Wall, Table Flush Front Pipe
Multiple Tube 33KBX35	12, 20, 30, 40, 50, 60, 80, 100	303 SS	350 PSIG	Wall, Table Flush Front
Micro Precision 34FB2TM 34MB2TM	10, 20	Stainless Steel	20 PSIG	Table
Acrylic Inclined 40AM10 40AX10	1, 2, 3, 6" 25, 50, 75, 150mm	Acrylic	100 PSIG	Wall Table
General Purpose Inclined 40HEX35	2, 4, 6, 8, 10, 12, 14, 16, 18, 20	Stainless Steel	350 PSIG	Wall
Draft Gauge Inclined 40GD10	½, 1, 1 ½, 2, 3, 4	Aluminum	100 PSIG	Wall

Consult factory for other available models and fluids.

CUSTOMER TESTIMONIAL

Accurate and simple. That basically describes Meriam manometers in a nutshell and that's the reason we keep coming back to Meriam for our manometer needs.

-Maintenance Manager

Wall Mount

Model 10AA25

Clean-Out U-Type Manometer

The Meriam 10AA25 manometer is a versatile, economical instrument for the measurement of pressures, vacuums or differential pressures.

The U-tube type manometer is a primary basic standard of pressure measurement. Pressure measurements are accomplished by balancing a vertical head of indicating fluid with the pressure to be measured. As there are no cams, gears or levers to operate in the manometer, the readings obtained are always accurate.

Model 10AA25 Construction

The manometer has a rigid cast aluminum body frame protecting the glass U-tube on three sides. Mounting holes are provided in the frame for mounting to a wall, column or other suitable structure.

The clean-out head at the top of the instrument seals the indicating tube legs and also provides for the external pressure connections to the manometer. The manometer head fastens to the body by a single nut and is quickly and easily removed when necessary. This exclusive Meriam clean-out head feature permits cleaning and filling of the U-tube without disconnecting the piping to the manometer head. A ¼" female pipe connection is provided out the left and right sides of the clean-out head as standard. Pressure connections at rear or top of head can be furnished when specified. Manometer clean-out heads of cast iron, stainless steel or PVC are available for special corrosive applications.

The manometer scale is located between the tube legs and overlaps the tube legs to a degree that eases reading at the meniscus position.

The scale is readily adjustable for zero indicating fluid level.

The simple engineered method of supporting and sealing the U-tube in this manometer permits easy tube replacement in the field.

Mano. Range Inches	A Inches	B Inches	C Inches	D Inches
6	10¾"	2 15/16"	2⅞"	—
10	15⅜"	2 15/16"	7½"	—
15	19⅛"	4 15/16"	7¼"	—
20	24⅜"	2⅝"	17"	1 11/16"
30	35"	3¾"	21⅜"	1 11/16"
50	55 7/16"	3⅛"	43 3/16"	1 11/16"

Range inches	6	10	15	20	30	50
Weight lbs.	2	3	3	4	5	6

Model 10AA25

Clean-Out U-Type Manometer

Specifications

Scales

A – Linear Inches & Tenths (Included as Standard)
F – Linear Centimeters & Millimeters
G – Inches & Tenths H_2O Using 827 Red Oil
H – Inches & Tenths H_2O Using 190 Blue Fluid
I – Inches & Fifths H_2O Using 295 Fluid (SS Head Only)
KPA/W – Kilopascals Using Water
MI – Cm H_2O Using 295 Fluid (SS Head Only)
Specials

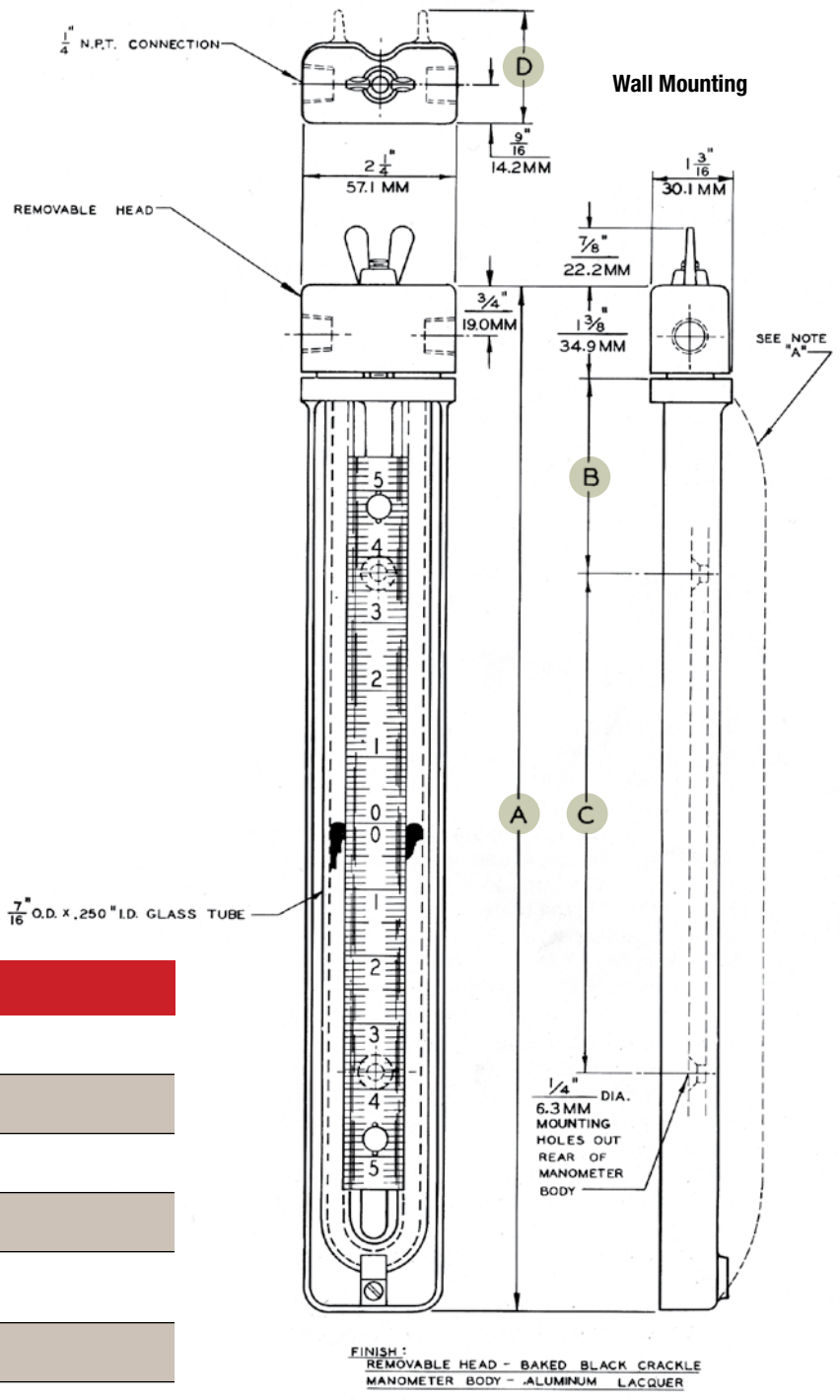
Accessories

Return Well Model: Z934H50
Bubbler Model: Z931R or Z931S
Line Trap Model: Z932R or Z932S
Valve & Piping Manifold: Z943AC300 – Steel
Z943AS300 – SS
Pressure vacuum Variator Model: Z971A3
Table Mounting Stand Model: Z912A
Slip On Cover Model: Z915C

Ordering Information

To order Meriam's 10AA25 manometer custom-made to your specifications, please contact your Meriam sales representative with the following information:

- Head Material
- Range
- Required Scale



Wall Mounting

Specifications	
Type	U-type
Range	6, 10, 15, 20, 30, 50 inches
Pressure Rating	250 PSIG
Mounting	Wall
Indicating Tube & Packing	Glass, Neoprene
Body Construction	Aluminum
Wetted Parts Material	Cast Iron, 316 SS, PVC
Scale Finish	Satin aluminum, black graduations
Finish	Aluminum body, black crackle enamel head

Table Mount

Model 20DAX40

Manometer

The Model 20DAX40 manometer is designed for the measurement of pressures, vacuums or differential pressures with a maximum operating pressure of 400 PSI.

This manometer is of very rigid construction designed primarily for high line pressure operation. Only carefully selected, fully annealed glass tubing is used. The manometer scale is located to permit quick and accurate reading of the indicating columns.

The U-tube type manometer is a primary basic standard of pressure measurement. Pressure measurements are accomplished by balancing a vertical head of indicating fluid with the pressure to be measured. As there are no cams, gears or levers to operate in the manometer the readings obtained are accurate.

Model 20DAX40 Construction

The manometer body has an aluminum channel to which stainless steel and blocks are connected. The wetted parts are type 304SS.

The glass tubing is gland packed with viton gaskets at each end block and is supported at spaced intervals to prevent tube distortion at elevated pressures. In place of the conventional U-tube of one continuous glass length, two straight length individual tubes are used in this manometer. To connect the two vertical glass tube legs to form the U, the lower manometer end block is cross-drilled.

The manometer scale is furnished with a white, non-glare satin background with black graduations and characters. The scale is adjustable for zero indicating fluid.

A transport cover seals the unit from dust and moisture and affords protection to the operator should excessive pressures cause an indicating tube to fracture.

Standard pressure connections are ¼ inch female pipe out the top of the upper end block. A drain plug out the bottom of the lower end block permits draining of the manometer indicating fluid and cleaning of the glass indicating tubes. The instrument finish is a durable textured, black urethane.

Fluid Requirements per Tube & Instrument Weight

Range	10	20	30	40	60	80	100
Mercury lbs.	1	1	2	2	2	3	3
295 Fluid lbs.	.25	.25	.5	.5	.5	.75	.75
Fl. Oz.	1	1	2	2	2	4	4
Weight lbs.	5	6	10	12	15	18	22

Model 20DAX40

Manometer

Specifications

Scales

A – Linear inches and tenths
B – Inches water pressure using mercury
C – Pounds and tenths using mercury (PSI)
F – Linear centimeters and millimeters
G – Inches and tenths of water pressure using Meriam 827 Red Oil
H – Inches and tenths of water pressure using Meriam 175 Blue Fluid
I – Inches and fifths of water pressure using Meriam 295 Red Fluid

Fluids	Nominal Sp. Gr.
Meriam 1000 Green Concentrate	1.000
Meriam 827 Red Oil	0.827
Meriam 100 Red Unity Oil	1.00
Meriam 295 Red Fluid	2.95

Dimensions Table

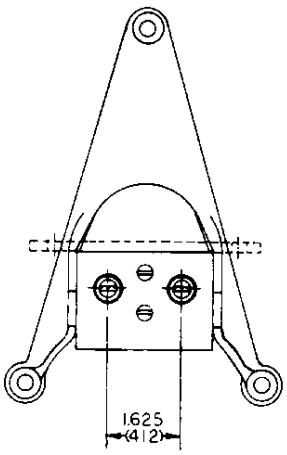
Range	A	B	C	D	E	F
10”	16.50 (419.1)	6.50 (165.1)	5.00 (127.0)	19.00 (482.6)	7.75 (196.9)	5.125 (130.2)
20”	26.50 (673.1)	10.50 (266.7)	8.00 (203.2)	29.00 (736.6)	7.75 (196.9)	5.125 (130.2)
30”	36.50 (927.1)	20.50 (520.7)	8.00 (203.2)	39.00 (990.6)	7.75 (196.9)	5.125 (130.2)
40”	46.50 (118.1)	30.50 (774.7)	8.00 (203.2)	49.00 (1224.6)	12.00 (304.8)	8.00 (203.2)
60”	60.50 (1689.1)	50.50 (1282.7)	8.00 (203.2)	69.00 (1752.6)	12.00 (304.8)	8.00 (203.2)
80”	86.50 (2197.1)	70.50 (1790.7)	8.00 (203.2)	89.00 (2260.6)	12.00 (304.8)	8.00 (203.2)
100”	106.50 (2705.1)	90.50 (2298.7)	8.00 (203.2)	109.00 (2768.0)	12.00 (304.8)	8.00 (203.2)

NOTE: All numbers in parenthses are in millimeters.

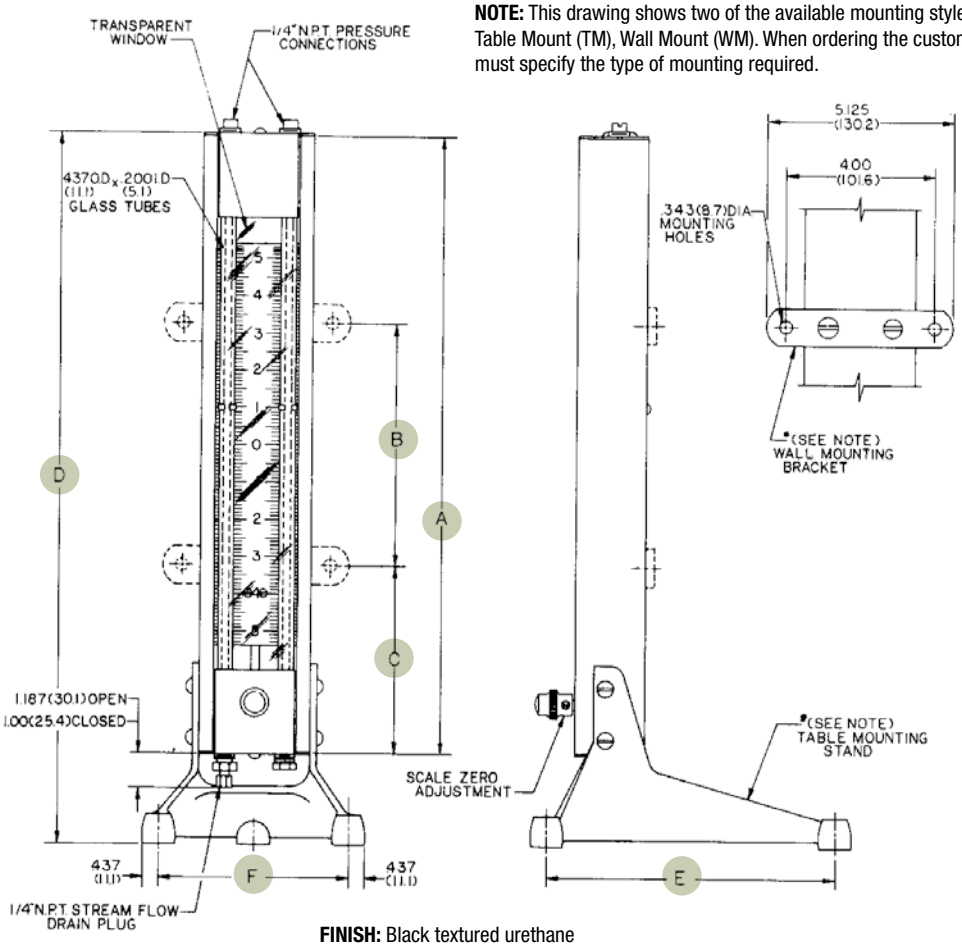
Ordering Information

To order Meriam’s 20DAX40 manometer custom-made to your specifications contact your Meriam sales represen the following information:

- Head Material
- Range
- Required Scale



NOTE: This drawing shows two of the available mounting styles: Table Mount (TM), Wall Mount (WM). When ordering the customer must specify the type of mounting required.



FINISH: Black textured urethane

MERIAM
Model 30EBX25
Table Mount

MERIAM
Model 30EBX50
Table Mount

MERIAM
Model 30EFX25 TM
Vernier Model

Model 30EBX25, 30EBX50, 30EFX25

Well Type Manometer

The Meriam Model 30EBX25 and 30EFX25 well type manometer are direct reading manometers designed for process, general purpose production testing, or laboratory measurement of pressures, vacuums or differential pressures.

Designed for a maximum operating pressure of 250 PSIG,* these instruments can also be used to measure flow, tank level, and pressure drop or distribution across operating equipment. Raised wells can be furnished so positive and negative pressures or reversing flow can be indicated without changing the pressure connections. Various mounting styles to satisfy installation requirements are available.

*Model for 500 psi is 30EBX50

Well Type Manometer Construction

The manometer body is of aluminum channel construction. Stainless steel end blocks, for packing the glass indicating tube, are screwed to the body. The 7/16" outside diameter glass tubing is yoke packed with viton gaskets at each end block and is supported at spaced intervals to prevent tube distortion.

The welded stainless steel manometer well has a large cross section and is readily removable for greatest ease in cleaning. Two ¼" female pipe connections are provided on the top side of the well; one outlet is normally used for the high pressure manometer connection, while the other, provided with a plug, is used as the well fill connection.

The unit scale, located directly behind the glass indicating tube, extends the full width of the instrument body and is graduated on each side of the indicating column. This scale has a white, non-glare satin background with black graduations and figures, and is compensated for liquid level change within the manometer well. The scale is adjustable for zero indicating fluid level by means of a non-slip, flexible shaft adjustment located in the lower end block and operated from the front of the instrument.

A transparent plexiglass cover protects the unit from dust and moisture. All exterior portions of the manometer are finished in textured, black urethane paint.

Standard pressure connections in the upper end block and at the manometer well for connecting the instrument are ¼" female pipe connections. Suitable drain, fill and vent plugs are furnished with each unit.

Model 30EBX25, 30EBX50, 30EFX25

Well Type Manometer

Specifications

Scales

A – Inches and tenths
F – Centimeters & Millimeters
G – Inches & tenths of water using 827 Red Oil
I – Inches & fifths using 295 Red Fluid
A/F – Duplex – Inches & tenths (left) centimeters & millimeter (right)
MI – Centimeters of water using 2.95 Fluid Specials

Fluid Requirements & Instrument Weight

Range	6	12	20	30	35	40	50	60	80	100
Weight	6	9	11	12	—	13	14	17	21	24
#3 Fluid lbs.	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	1.5	1.5
Fl. Oz.	4	4	4	4	4	4	4	4	7	7

Consult factory for special scale and fluids.

Accessories

Bubbler – model Z931R or Z931S
Line Trap – model Z932R or Z932S
Moisture Trap – model Z933A10
Pressure/Vacuum Variator – model Z971A3
Tank Gauge Accessories
Pipe Saddle – model Z912S
Raised Well

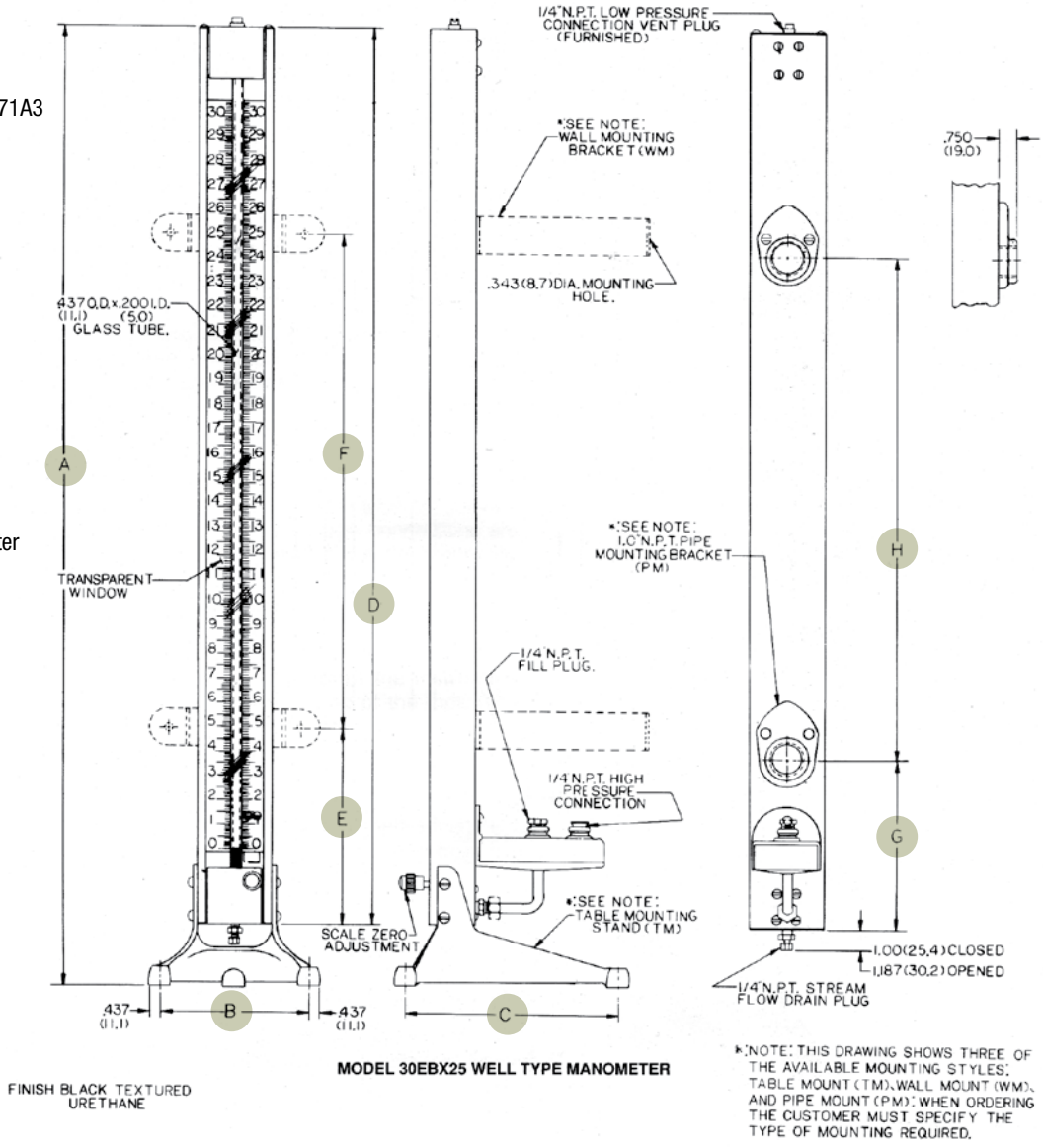
Available Fluids

Z922WA – 1000 Green Concentrate
Z923RO – 827 Red Oil
Z923RU – 100 Red Unity Oil
Z923BFL – 190 Blue Fluid
Z924BA – 295 Red Fluid

Ordering Information

To order a Meriam well-type manometer custom-made to your specifications, please contact your Meriam sales representative with the following information:

- Range
- Mounting Style
- Safe Working Pressure
- Scale Description



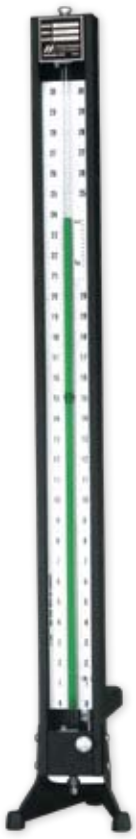
MODEL 30EBX25 WELL TYPE MANOMETER

FINISH BLACK TEXTURED URETHANE

*NOTE: THIS DRAWING SHOWS THREE OF THE AVAILABLE MOUNTING STYLES: TABLE MOUNT (TM), WALL MOUNT (WM), AND PIPE MOUNT (PM); WHEN ORDERING THE CUSTOMER MUST SPECIFY THE TYPE OF MOUNTING REQUIRED.

MERIAM
Model 30EBX25
Table Mount

MERIAM
Model 30EBX50
Table Mount



MERIAM
Model 30EFX25 TM
Vernier Model

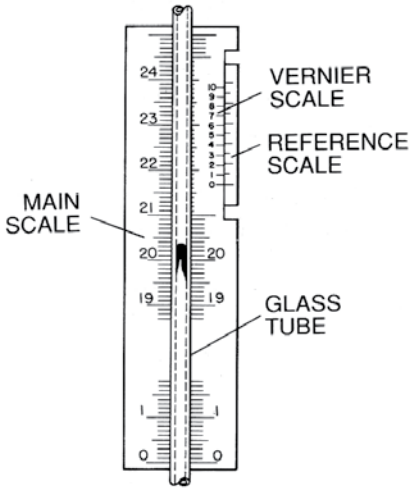
Model 30EBX25, 30EBX50, 30EFX25

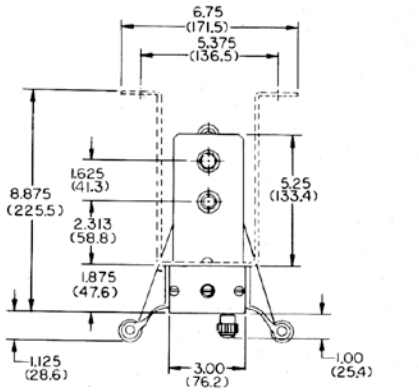
Well Type Manometer *(Specifications Continued)*

Dimensions Table

Range	A	B	C	D	E	F	G	H
6”	15.25 (387.4)	5.125 (130.2)	7.75 (196.9)	12.75 (323.9)	6.25 (158.9)	3.75 (95.3)	9.00 (228.6)	—
12”	21.25 (539.8)	5.125 (130.2)	7.75 (196.9)	18.75 (476.3)	8.00 (203.2)	5.50 (139.7)	7.00 (177.8)	—
20”	29.25 (743.0)	5.125 (130.2)	7.75 (196.9)	26.75 (679.5)	8.00 (203.2)	10.50 (266.7)	7.00 (177.8)	—
30”	39.25 (997.0)	5.125 (130.2)	7.75 (196.9)	36.75 (933.5)	8.00 (203.2)	20.50 (520.7)	7.00 (177.8)	19.50 (495.3)
35”	44.25 (1124.0)	8.00 (203.2)	12.00 (304.8)	41.75 (1060.5)	8.00 (203.2)	25.50 (647.7)	7.00 (177.8)	24.50 (622.30)
40”	49.25 (1251.0)	8.00 (203.2)	12.00 (304.8)	46.75 (1187.5)	8.00 (203.2)	30.50 (774.7)	7.00 (177.8)	29.50 (749.3)
50”	59.25 (1505.0)	8.00 (203.2)	12.00 (304.8)	56.75 (1441.5)	8.00 (203.2)	40.50 (1028.7)	7.00 (177.8)	39.50 (1003.3)
60”	69.25 (1759.0)	8.00 (203.2)	12.00 (304.8)	66.75 (1695.5)	8.00 (203.2)	50.50 (1282.7)	7.00 (177.8)	49.50 (1257.3)
80”	89.25 (2267.0)	8.00 (203.2)	12.00 (304.8)	86.75 (2203.5)	8.00 (203.2)	70.50 (1790.7)	7.00 (177.8)	69.50 (1765.3)
100”	109.25 (2775.0)	8.00 (203.2)	12.00 (304.8)	106.75 (2711.5)	8.00 (203.2)	90.50 (2298.7)	7.00 (177.8)	89.50 (2273.3)

NOTE: All numbers in parentheses are in millimeters.



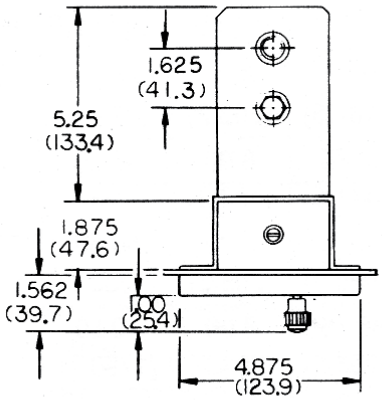


Verniers

With the full scale vernier, readings can be obtained to 1/10 of the main scale subdivision. A reading is observed by aligning the fluid meniscus with the nearest lower scale division. The distance required to accomplish this is measured on the vernier scale. This is added to the main scale for overall reading.

Model 30EBX25, 30EBX50, 30EFX25

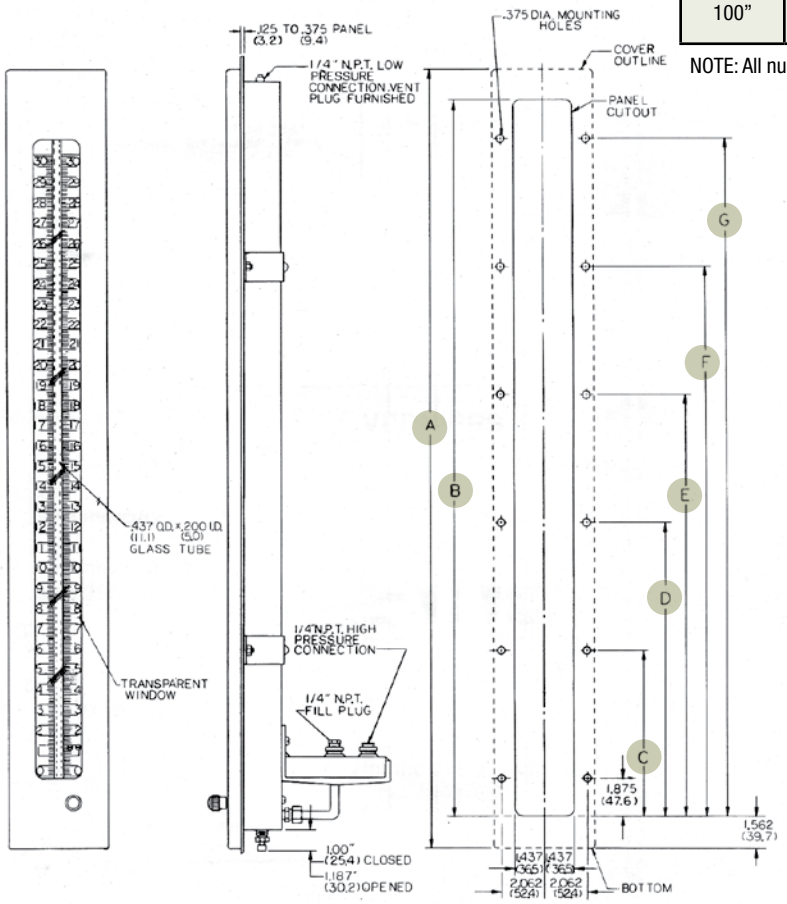
Well Type Manometer *(Specifications Continued)*



Dimensions Table

Range	A	B	C	D	E	F	G
6”	14.375 (365.1)	11.250 (285.8)	5.625 (142.9)	9.375 (238.1)	—	—	—
12”	20.375 (517.5)	17.250 (438.2)	7.375 (187.4)	12.875 (327.0)	15.375 (390.5)	—	—
20”	28.375 (720.7)	25.250 (641.4)	7.375 (187.4)	17.875 (454.0)	23.375 (593.7)	—	—
30”	38.375 (974.7)	35.250 (895.4)	7.375 (187.4)	17.625 (447.7)	27.875 (708.0)	33.375 (847.7)	—
35”	43.375 (1101.7)	40.250 (1022.4)	7.375 (187.4)	20.125 (511.2)	32.875 (835.0)	38.375 (974.7)	—
40”	48.375 (1228.7)	45.250 (1149.4)	7.375 (187.4)	22.625 (574.7)	37.875 (962.0)	43.375 (1101.7)	—
50”	58.375 (1482.7)	55.250 (1403.40)	7.375 (187.4)	191.25 (485.8)	36.125 (917.6)	47.875 (1216.0)	53.375 (1355.7)
60”	68.375 (1736.7)	65.250 (1657.4)	7.375 (187.4)	66.75 (1695.5)	42.125 (1070.0)	57.875 (1470.0)	63.375 (1609.7)
80”	88.375 (2244.7)	85.250 (2165.4)	7.375 (187.4)	29.125 (739.8)	56.125 (1425.6)	77.875 (1978.0)	83.375 (2117.7)
100”	108.375 (2572.7)	105.250 (2673.4)	7.375 (187.4)	36.125 (917.6)	69.125 (1755.8)	97.875 (2486.0)	103.37 (2625.7)

NOTE: All numbers in parentheses are in millimeters.



Model 33KBX35

Multiple Tube Well Type Manometer

Model 33KBX35, Meriam multiple tube well type manometer, is a versatile instrument used in production testing, process measurement, and for laboratory data analysis. Up to six individual direct reading manometer systems are enclosed in individual compact cases. Each tube (system) can be used to measure pressure, vacuum, differential pressure, flow or liquid level. Complex pressure distributions or multiple pressure relationships are easily observed and readily compared.

Different manometer fluids of various densities can be used in each tube. The scales can be graduated as required. Flexibility for various application requirements is possible by design modifications. For example, raised wells can be furnished so positive and negative pressures can be indicated without changing the pressure connections.

The multiple tube type manometer is widely used for tank liquid level measurement. Many tanks located remotely on a tank farm are connected to the level gauges in the central control instrument panel. Special scales can be graduated duplex to indicate tank liquid depth in feet and inches, as well as tank capacity in gallons or pounds.

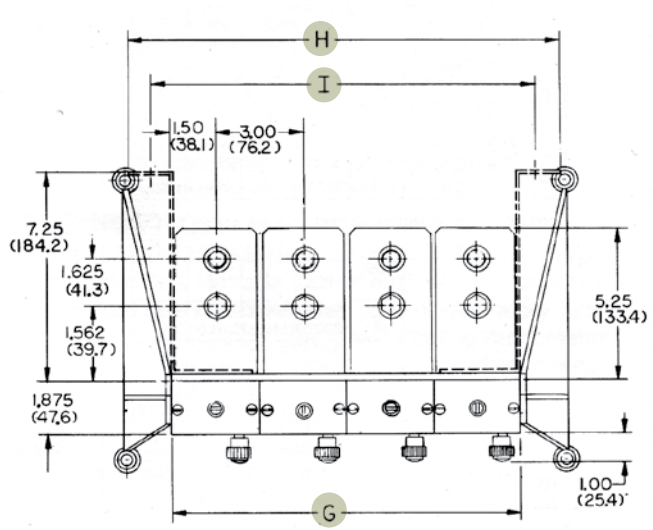
Model 33KBX35 Construction

The indicating tubes are ruggedly housed in individual aluminum channels which are securely connected together. The end blocks are constructed of stainless steel. Each manometer has a large bore glass indicating tube (securely packed with leakproof seals) to give a bold, easy-to-read indicating column with any manometer fluid. Stainless steel fluid wells of large cross sectional area are fabricated to close dimensional tolerances. Individual measuring scales, with sharp black graduations on a non-glare white satin background, extend on both sides of the indicating column. Large numerals at both ends of major graduations provide at-a-glance readability. Individual scale adjustment for zero reference is conveniently made on each tube of the instrument. The framed window provides protection from dirt and moisture. Each tube has the Meriam Stream-Flow drain valve to facilitate draining. The instrument finish is a durable black textured urethane. In addition to the table mounting (TM) style shown here, wall mounting (WM) and flush front mounting (FF) styles are also available.

Model 33KBX35

Multiple Tube Well Type Manometer

NOTE: This drawing shows two of the available mounting styles: Table Mount (TM), Wall Mount (WM). When ordering the customer must specify the type of mounting required.



Dimensions Table

Tube Quantity	F* Ranges 6" - 30"	F* Ranges 35" - 100"	G	H	I
2	9.125 (231.8)	10.00 (254.0)	6.00 (152.4)	8.875 (225.5)	7.375 (187.3)
3	12.125 (308.0)	13.00 (330.2)	9.00 (228.6)	11.875 (301.6)	10.375 (263.5)
4	15.125 (384.2)	16.00 (406.4)	12.00 (304.8)	14.875 (377.8)	13.375 (339.7)
5	18.125 (460.4)	19.00 (482.6)	15.00 (381.0)	17.875 (454.0)	16.375 (415.9)
6	21.125 (536.6)	22.00 (558.8)	18.00 (457.2)	20.875 (530.2)	19.375 (492.1)

NOTE: All numbers in parentheses are in millimeters.
*F is distance between mounting feet on table mount model (see page 72)

Specifications

Scales

A – Inches and tenths
F – Centimeters & Millimeters
G – Inches & tenths of water using 827 Red Oil
I – Inches & fifths using 295 Red Fluid

Made to Order

Fluid Requirements per Tube & Instrument Weight

Range	6	12	20	30	35	40	50	60	80	100
295 Fluid lbs.	.75	.75	.75	.75	.75	.75	.75	.75	1.5	1.5
Fl. Oz.	4	4	4	4	4	4	4	4	7	7
Weight Lbs. x No. Tubes	6	9	11	12	12.5	13	14	17	21	24

Fluids

Fluids	Nominal Sp. Gr.
Meriam 1000 Green Concentrate	1.000
Meriam 827 Red Oil	0.827
Meriam 100 Red Unity Oil	1.00
Meriam 190 Blue Fluid	1.90
Meriam 295 Red Fluid	2.95

Accessories

Fluid Check Valve	Z942K50
Line Trap	Z932A35
Line Trap	Z932R10
Moisture Trap	Z933A10
Valves & Piping	Z943AC300 (Steel)
	Z943AS300 (Stainless Steel)

Ordering Information

To order Meriam's 33KBX35 manometer custom-made to your specifications, please contact your Meriam sales representative with the following information:

- Range
- Mounting Style
- Safe Working Pressure
- Scale Description
- Number of Tubes

Specifications	
Ranges	6, 12, 20, 30, 35, 40, 50, 60, 80, 100
Pressure Rating	350 psi
Mounting	Wall, Table, Flush Front
No. of Tubes	3, 4, 5, 6
Body Construction	Aluminum Channels
Wetted Parts	Stainless Steel, Glass, Viton
Connections	¼" NPTs
Scale	Aluminum, nonglare white satin finish with black graduations
Case Finish	Black textured urethane

Model 33KBX35

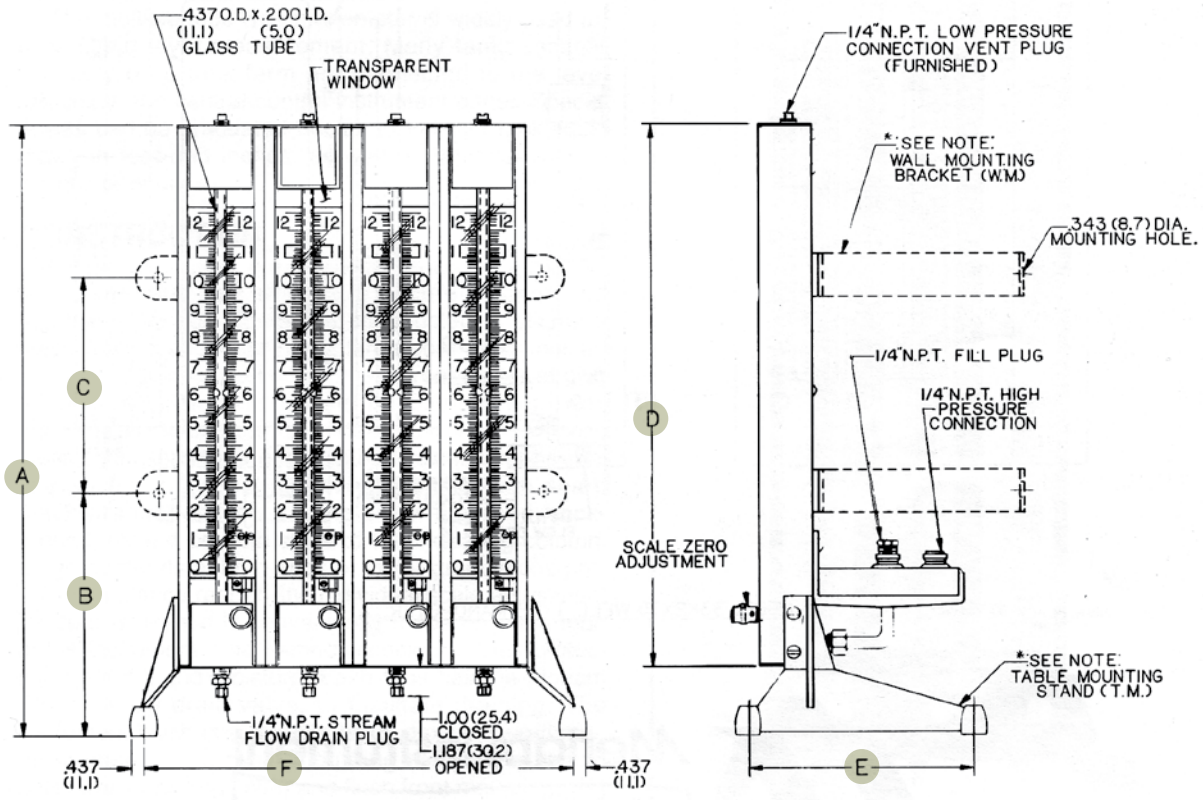
Multiple Tube Well Type Manometer

(Specifications Continued)

Dimensions Table

Range	A	B	C	D	E
6”	15.250 (387.4)	6.250 (158.9)	3.750 (95.3)	12.75 (323.9)	7.75 (196.9)
12”	21.250 (539.8)	8.00 (203.2)	5.50 (139.7)	18.75 (476.3)	7.75 (196.9)
20”	29.250 (743.0)	8.00 (203.2)	10.50 (266.7)	26.75 (679.5)	7.75 (196.9)
30”	39.250 (997.0)	8.00 (203.2)	20.50 (520.7)	36.75 (933.5)	7.75 (196.9)
35”	44.250 (1124.0)	8.00 (203.2)	25.50 (647.7)	41.75 (1060.5)	12.00 (304.8)
40”	49.250 (1251.0)	8.00 (203.2)	30.50 (774.7)	46.75 (1187.5)	12.00 (304.8)
50”	59.250 (1505.0)	8.00 (203.2)	40.50 (1028.7)	56.75 (1441.5)	12.00 (304.8)
60”	69.250 (1759.0)	8.00 (203.2)	50.50 (1282.7)	66.75 (1695.5)	12.00 (304.8)
80”	89.250 (2267.0)	8.00 (203.2)	70.50 (1790.7)	86.75 (2203.5)	12.00 (304.8)
100”	109.250 (2775.0)	8.00 (203.2)	90.50 (2298.7)	106.75 (2711.5)	12.00 (304.8)

NOTE: All numbers in parentheses are in millimeters.



Model 33KBX35

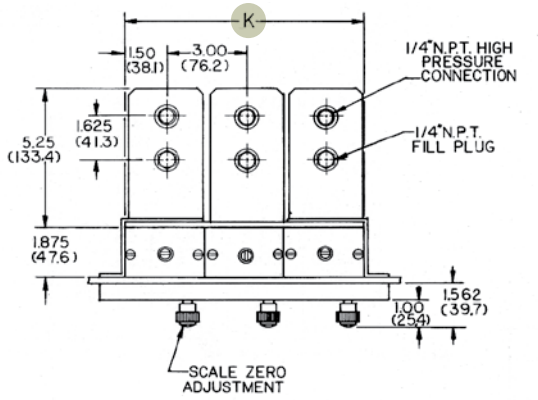
Multiple Tube Well Type Manometer

(Specifications Continued)

Dimensions Table 1

Range	A	B	C	D	E	F	G
6”	14.375 (365.1)	11.250 (285.8)	5.625 (142.9)	9.375 (238.1)	—	—	—
12”	20.375 (517.5)	17.250 (438.2)	7.375 (187.4)	12.875 (327.0)	15.375 (390.5)	—	—
20”	28.375 (720.7)	25.250 (641.4)	7.375 (187.4)	17.875 (454.0)	23.375 (593.7)	—	—
30”	38.375 (974.7)	35.250 (895.4)	7.375 (187.4)	17.625 (447.7)	27.875 (708.0)	33.375 (847.7)	—
35”	43.375 (1101.7)	40.250 (1022.4)	7.375 (187.4)	20.125 (511.2)	32.875 (835.0)	38.375 (974.7)	—
40”	48.375 (1228.7)	45.250 (1149.4)	7.375 (187.4)	22.625 (574.7)	37.875 (962.0)	43.375 (1101.7)	—
50”	58.375 (1482.7)	55.250 (1403.4)	7.375 (187.4)	19.125 (485.8)	36.125 (917.6)	47.875 (1216.0)	53.375 (1355.7)
60”	68.375 (1736.7)	65.250 (1657.4)	7.375 (187.4)	23.125 (587.4)	42.125 (1070.0)	57.875 (1470.0)	63.375 (1609.7)
80”	88.375 (2244.7)	85.250 (2165.4)	7.375 (187.4)	29.125 (739.8)	56.125 (1425.6)	77.875 (1978.0)	83.375 (2117.7)
100”	108.375 (2572.7)	105.250 (2673.4)	7.375 (187.4)	36.125 (917.6)	69.125 (1755.8)	97.875 (2486.0)	103.375 (2625.7)

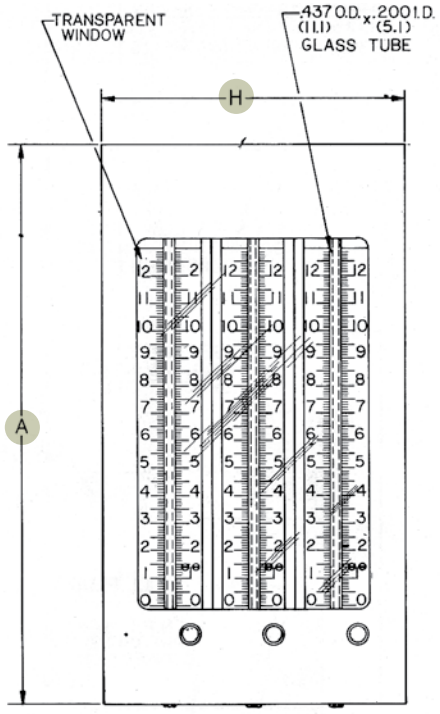
NOTE: All numbers in parenthses are in millimeters.

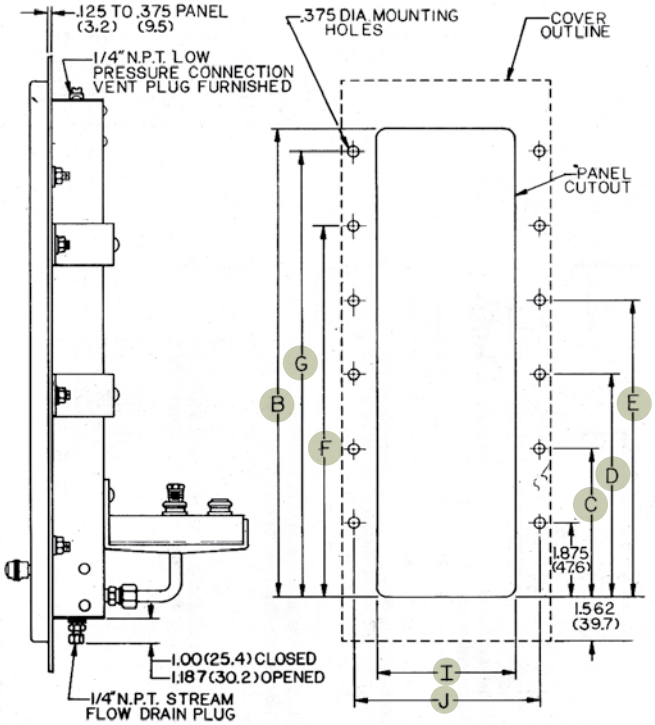


Dimensions Table 2

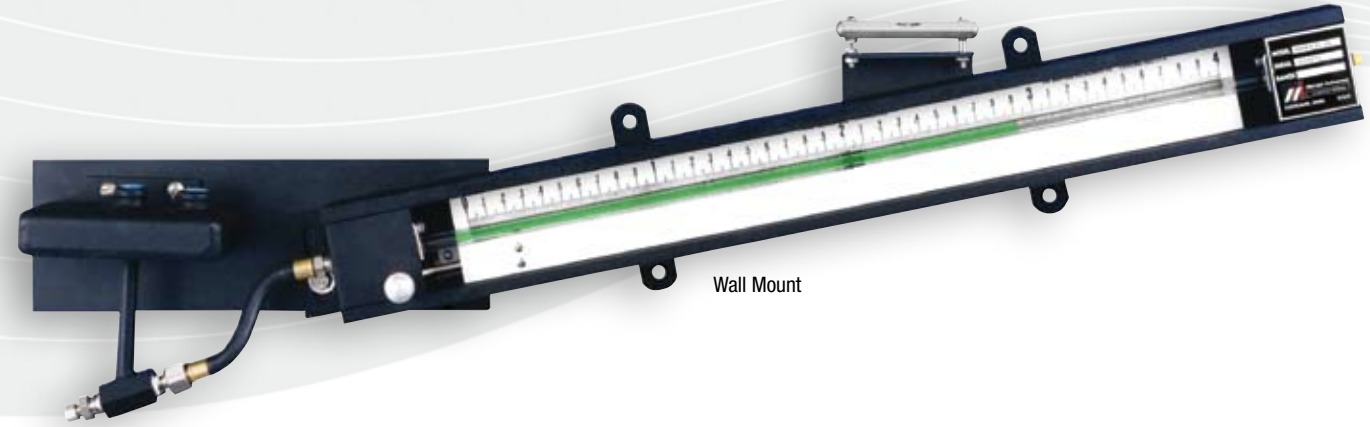
Tube Quantity	H	I	J	K
2	7.875 (200.0)	5.875 (149.2)	7.125 (181.0)	6.00 (152.4)
3	10.875 (276.2)	8.875 (225.4)	10.125 (257.2)	9.00 (228.6)
4	13.875 (352.4)	11.875 (301.6)	13.125 (333.4)	12.00 (304.8)
5	16.875 (428.6)	14.875 (377.8)	16.125 (409.6)	15.00 (381.0)
6	19.875 (504.8)	17.875 (454.0)	19.125 (485.8)	18.00 (457.2)

NOTE: All numbers in parenthses are in millimeters.





FINISH: Black textured urethane



Wall Mount

Model 40HEX35

Inclined Tube Manometer

Model 40HEX35-WM inclined well type manometer for wall mounting is offered with scales from 20” to 60” long in differential ranges from 2” to 20”. This economical and durable instrument fills the high sensitivity and accuracy requirements for low differential pressure ranges at operating pressures up to 350 PSI.

Inclined manometers provide greater readability by stretching a vertical differential along an inclined indicating column, giving more graduations per unit of vertical height and increasing the instrument’s sensitivity and accuracy. Inclined manometers frequently have scales graduated to hundredths of an inch.

The Model 40HEX35 is often used to indicate differential across Meriam Laminar Flow Elements, Accutubes and Orifice Plates in gas flow applications.

Model 40HEX35 Construction

Model 40HEX35-WM inclined manometer has an aluminum channel with stainless steel end blocks into which a large bore, borosilicate glass tube is securely yoke packed with viton gaskets. The removable well is bolted to the back plate and connected to the glass tube through the lower end block. All pressure connections are ¼” female pipe thread.

The scale with satin background, bold black figures, and precision graduations spans the full channel width behind the indicating tube. Scale and tube are protected by a transparent cover.

Each Model 40HEX35 is individually calibrated and the angle of inclination is set relative to the instrument level mounted above the channel.

The instrument finish is black textured urethane.

Fluid Requirements per Tube & Instrument Weight

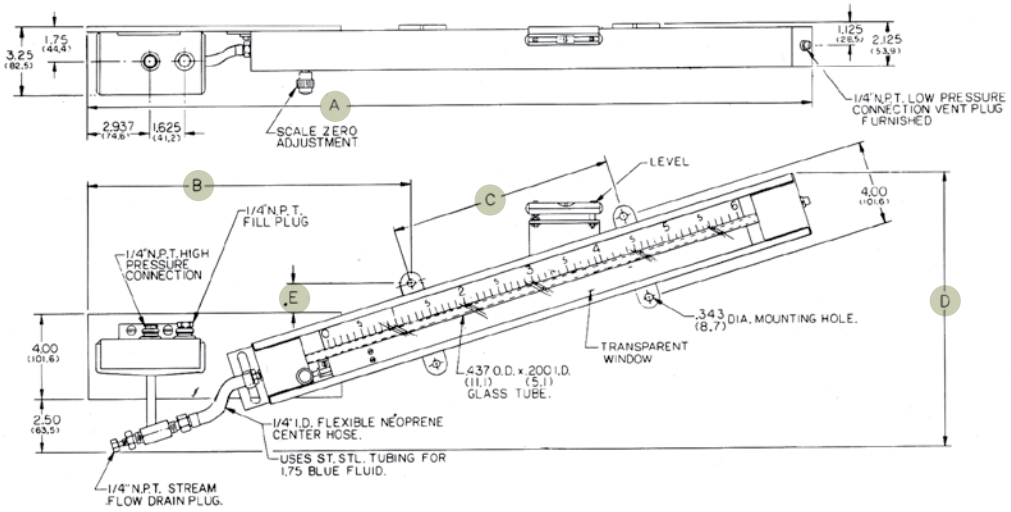
Scale Length	20”	30”	40”	50”	60”
Weight-lbs.	25	30	35	40	45
Fill Fluid Req.	4 oz.	4 oz.	4 oz.	4 oz.	4 oz.

Ranges and Scales

Scale Length	Ranges in inches with Scale graduated inches & hundredths	Ranges in inches with Scale graduated inches and fiftieths
20”	2”, 4”	6”, 8”, 10”
30”	4”, 6”, 8”	10”, 12”, 14”
40”	4”, 6”, 8”, 10”	12”, 14”, 16”, 18”, 20”
50”	4”, 6”, 8”, 10”, 12”	14”, 16”, 18”, 20”
60”	6”, 8”, 10”, 12”, 14”	16”, 18”, 20”

Model 40HEX35

Inclined Tube Manometer



20" SCALE LENGTH

Range	A	B	C	D	E
2"	34.68 (881.04)	15.93 (404.81)	10.50 (266.7)	8.375 (212.72)	.50 (12.7)
4"	34.50 (876.3)	15.62 (396.87)	10.50 (266.7)	10.68 (271.46)	.937 (23.81)
6"	34.06 (865.18)	15.31 (388.93)	10.50 (266.7)	13.00 (330.2)	1.375 (34.92)
8"	33.31 (846.13)	14.93 (379.41)	10.50 (266.7)	15.25 (387.35)	1.812 (46.03)
10"	32.31 (820.74)	14.50 (368.3)	10.50 (266.7)	17.50 (444.5)	2.187 (55.56)

30" SCALE LENGTH

Range	A	B	C	D	E
4"	44.56 (1131.8)	15.81 (401.6)	20.50 (520.7)	10.43 (265.1)	.625 (15.87)
6"	44.31 (1125.4)	15.62 (396.8)	20.50 (520.7)	12.62 (320.6)	.937 (23.81)
8"	43.87 (1114.4)	15.43 (392.1)	20.50 (520.7)	14.87 (377.8)	1.25 (31.75)
10"	43.25 (1098.5)	15.18 (385.7)	20.50 (520.7)	17.06 (433.3)	1.50 (38.1)
12"	42.50 (1079.5)	14.93 (379.4)	20.50 (520.7)	19.25 (488.9)	1.81 (46.0)
14"	41.56 (1055.6)	14.62 (371.4)	20.50 (520.7)	21.43 (544.5)	2.06 (52.3)

40" SCALE LENGTH

Range	A	B	C	D	E
4"	54.56 (1385.8)	15.93 (404.8)	30.50 (774.7)	10.31 (261.9)	.50 (12.7)
6"	54.37 (1381.1)	15.75 (400.0)	30.50 (774.7)	12.43 (315.9)	.687 (17.4)
8"	540.06 (1363.1)	15.62 (396.8)	30.50 (774.7)	14.62 (371.4)	.937 (23.8)
10"	53.68 (1333.5)	15.50 (393.7)	30.50 (774.7)	16.75 (425.4)	1.187 (30.1)
12"	53.12 (1349.4)	15.31 (388.9)	30.50 (774.7)	18.93 (481.0)	1.375 (34.9)
14"	52.50 (1333.5)	15.12 (384.1)	30.50 (774.7)	21.06 (534.9)	1.56 (39.6)
16"	51.68 (1312.8)	14.93 (379.4)	30.50 (774.7)	23.18 (588.9)	1.81 (46.0)
18"	50.75 (1289.0)	14.68 (373.0)	30.50 (774.7)	25.31 (642.9)	2.00 (50.8)
20"	49.68 (1262.01)	14.50 (368.3)	30.50 (774.7)	27.43 (696.9)	2.18 (55.5)

50" SCALE LENGTH

Range	A	B	C	D	E
4"	64.62 (1641.4)	16.00 (406.4)	40.50 (1281.7)	10.18 (258.7)	.375 (9.52)
6"	64.43 (1636.7)	15.87 (403.2)	40.50 (1281.7)	12.31 (312.7)	.562 (14.2)
8"	64.25 (1631.9)	15.75 (400.0)	40.50 (1281.7)	14.43 (366.7)	.750 (19.0)
10"	63.87 (1622.4)	15.62 (396.8)	40.50 (1281.7)	16.56 (420.6)	.937 (23.8)
12"	63.50 (1612.9)	15.50 (393.7)	40.50 (1281.7)	18.68 (474.6)	1.12 (28.5)
14"	63.00 (1600.2)	15.37 (390.5)	40.50 (1281.7)	20.81 (528.6)	1.31 (33.3)
16"	62.37 (1584.3)	15.25 (387.3)	40.50 (1281.7)	22.93 (582.6)	1.43 (36.5)
18"	61.68 (1566.8)	15.12 (384.1)	40.50 (1281.7)	25.06 (636.5)	1.62 (41.2)
20"	60.87 (1546.2)	14.93 (379.4)	40.50 (1281.7)	27.18 (690.5)	1.81 (46.0)

60" SCALE LENGTH

Range	A	B	C	D	E
6"	74.50 (1892.3)	15.93 (404.8)	50.50 (1282.7)	12.25 (311.1)	.50 (12.7)
8"	74.31 (1887.5)	15.81 (401.6)	50.50 (1282.7)	14.31 (363.5)	.625 (15.8)
10"	74.06 (1881.6)	15.75 (400.0)	50.50 (1282.7)	16.43 (417.5)	.750 (19.0)
12"	73.68 (1871.6)	15.62 (396.8)	50.50 (1282.7)	18.56 (471.4)	.937 (23.8)
14"	73.31 (1862.1)	15.56 (395.2)	50.50 (1282.7)	20.62 (523.8)	1.06 (26.9)
16"	72.81 (1849.4)	15.43 (392.1)	50.50 (1282.7)	22.75 (577.8)	1.25 (31.7)
18"	72.25 (1835.1)	15.31 (388.9)	50.50 (1282.7)	24.81 (630.2)	1.37 (34.9)
20"	71.62 (1819.2)	15.18 (385.7)	50.50 (1282.7)	26.93 (684.2)	1.50 (38.1)

Ordering Information

To order Meriam's 40HEX35 manometer custom-made to your specifications, please contact your Meriam sales representative with the following information:

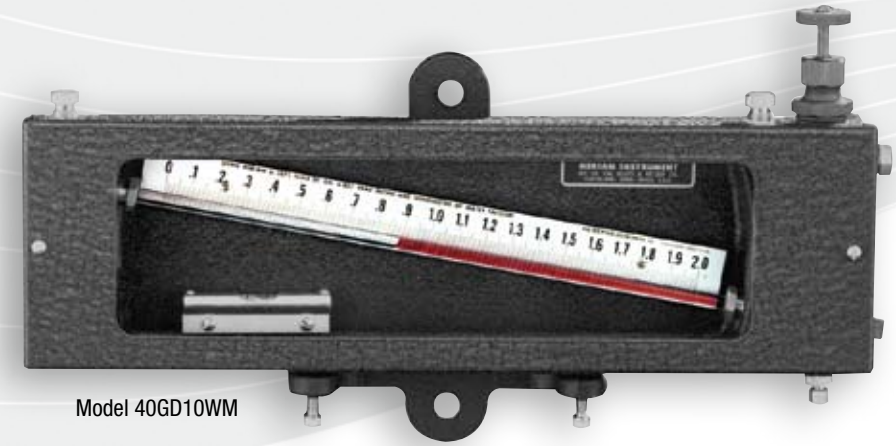
- Model
- Scale Length
- Differential Range

Accessories:

Check Valve Model	Z942K50
3 Valve & Piping Manifold (Steel)	Z943AC300 STL
3 Valve & Piping Manifold (SS)	Z943AC300 ST.STL

Specifications

Type	Inclined Tube
Range	2", 4", 6", 8", 10", 12", 14", 16", 18", 20"
Pressure Rating	350 psig
Body Construction	Aluminum Channel
Wetted Parts Material	304 SS
Connections	¼" NPT pressure, ¼" drain
Scale Finish	White non-glare satin with black graduations
Finish	Black Textured urethane
Scale Graduations	Inches and Fiftieths, Inches and Hundredths or Special flow scales



Model 40GD10WM

Model 40GD10

Inclined Tube Manometer
Draft Gauge

The Meriam Model 40GD10 Inclined Tube Manometer provides accurate measurement of low pressures, drafts, and small differential pressure changes, as in air or gas flow metering. It is available in six ranges and in both left zero and intermediate zero models. This design assures long-time accuracy and repeatability for accurate low pressure measurements. Each gauge is individually factory calibrated before shipment.

Model 40GD10 Construction

The liquid indicating column in the Model 40GD10 Manometer is inclined at an angle. This design greatly expands the vertical height reading range for extremely accurate readings. Through 2 inch range, graduations are 0.01 inches of water pressure using Meriam 827 Red Oil divided over 11 inches of scale. The 3 and 4 inch range have graduations 0.02 inches of water pressure using Meriam 827 Red Oil divided over 12 inches of scale. The instrument scale with sharp black graduations on a non-glare, satin-white background is located directly behind the indicating tube. Large numerals at major graduations provide at-a-glance readability. The indicating fluid used is Meriam Red Oil, Sp. Gr. 827 which provides maximum contrast with the scale and graduations. For greater range other Meriam indicating fluids may be used.

Two adjusting screws in the gauge mounting bracket and a double-hairline level simplify accurate leveling of the gauge. The liquid column is then easily set to scale zero. The scale zero is precisely adjusted by a plunger unit which displaces liquid in the instrument well. A Meriam Stream Flow drain valve is a standard feature.

The borosilicate glass tube is gland packed with viton seals. The transparent viewing window is framed in a sturdy cover which protects the gauge interior from dust. Cover and lightweight cast aluminum body are finished in baked black crackle enamel.

Model 40GD10

Inclined Tube Manometer Draft Gauge

Scale Graduations

Instrument Range	Scale Reading in Inches
½”	0...+0.5*
½”	-0.1...0...+0.4
1”	0...+1.0*
1”	-0.1...0...+0.9
1½”	0...+1.5*
1½”	-0.5...0...+1.0
1½”	-0.1...0...+1.4
2”	0...+2.0*
2”	-0.5...0...+1.5
3”	0...+3.0*
3”	-0.1...0...+2.0
4”	0...+4.0*
4”	-0.1...0...+3.0

*Standard scales, all other are special

Also Available w/ raised zero as special scales

Standard Scale Graduations
SCALE “N” Inches and hundredths of water pressure using Meriam Red Oil Specific Gravity 0.827
SCALE “O” Inches and fiftieths of water pressure using Meriam Red Oil Specific Gravity 0.827

Fluid Requirements & Instrument Weight

Range Inches of Water (using 827)	½”	1”	1½”	2”	3”	4”
Range Inches of Water (using 100)	.605	1.209	1.814	2.418	3.628	4.837
Range Inches of Water (using 190)	1.15	2.3	3.45	4.61	6.91	9.21
Range Millimeters of Water (using 827)	12.7	25.4	38.1	50.8	76.2	101.6
Weight*	9#	9#	9#	9#	16#	16#
Fluid Ounces	4	4	4	4	4	4

*For Table Mounting add 9 pounds

Ordering Information

To order Meriam’s 40GD10 manometer custom-made to your specifications, please contact your Meriam sales representative with the following information:

- Mounting Style
- Range

Accessories

Z944A4	Venting Petcock
Z911A	Male Hose Nipple
Z912A	Table Mounting Stand
Z943AC300	Steel Valve & Piping Manifold
Z943AS300	S.S. Valve & Piping Manifold

Fluids Available

	Nominal Sp. Gr.
Meriam 827 Red Oil	.827
Meriam 100 Unity Oil	1.000
Meriam 190 Blue Fluid	1.90

Specifications	
Type	Inclined Tube
Range	½, 1, 1½, 2, 3, 4, inches H_2O using Meriam 827 Red Oil
Pressure Rating	100 psig
Mounting	Wall, Table (Weather Proof construction available in wall mounting style)
Indicating Tube & Packing	Glass, Viton
Wetted Parts Material	Aluminum, Steel, Glass
Scale Finish	White non-glare satin with black graduations
Connections	¼” NPT

Models 34FB2TM (English Units) and 34MB2TM (Metric Units)

Meriam Micromanometers

The Meriam Micromanometer is a sensitive manometer indicating pressures, vacuums, or differential pressures to 0.001" water pressure.

The unit is an accurate primary standard for checking and calibrating low pressure or vacuum gauges, draft gauges, inclined manometers and low pressure diaphragm or bellows controls. Although a calibrating standard, it may be used as a conventional manometer.

The Meriam Micromanometer is simple to operate, surpassing other precision pressure instruments. Readings on the micromanometer can be achieved quickly and accurately.

The true measurement of a given pressure, vacuum or differential pressure is the distance traveled by the instrument well from the initial calibrating position. All readings are taken with the meniscus positioned at the reference calibrating point. Because of this, the variation in the indicating tube inside diameter and indicating fluid level change in the well do not influence the accuracy of the instrument.

Micromanometer Construction

The Meriam Micromanometer is a special well type manometer design incorporating a well movable in the vertical plane by means of a precision lead screw. The vertical distance traveled by the instrument well is measured by means of an indicator pointer attached to the well, moving along a uniformly graduated scale and a micrometer wheel attached directly to the lead screw.

The lead screw is rotated by means of an operating wheel at the base of the instrument through a gear mechanism. The gear mechanism provides only the necessary torque to rotate the lead screw, preventing gear wear or play from affecting the accuracy of the measurement.

The glass indicating tube is rigidly supported within the instrument frame. The inclined tube portion of the indicating tube is at a minimum slope angle to give a high degree of sensitivity for accurate reading of the indicating fluid meniscus. An etched hair line on the inclined tube provides a fixed reference point for all measurements. The indicating tube is connected to the instrument well by means of a flexible tube.

All metal parts of the instrument in contact with the indicating fluid are fabricated of stainless steel. The exterior surfaces are finished in a fine, black, baked crackle. A clear plastic cover in a detachable cover frame gives full vision of all scales and protects the unit from dust and moisture.

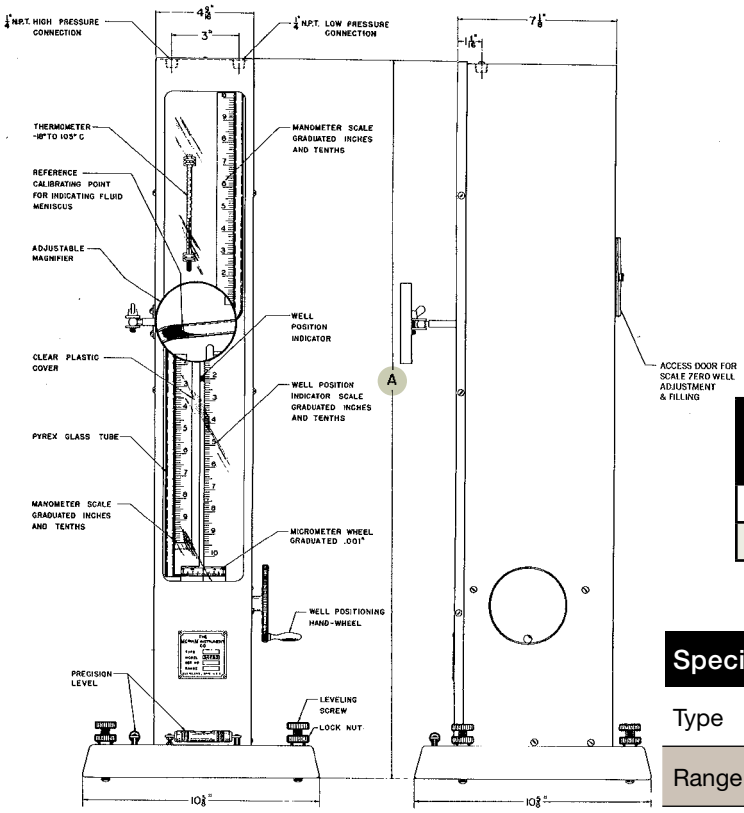
For the initial adjustment of the indicating fluid meniscus in the sloping portion of the indicating tube, the instrument well is adjustable vertically, independent of the operating lead screw. A locking screw is provided on the well adjustment mechanism to ensure the well setting after adjustment.

Standard ¼" N.P.T. pressure connections are provided at the top of the unit. Independent connections permit micromanometer operation under pressure, vacuum or differential pressure conditions.

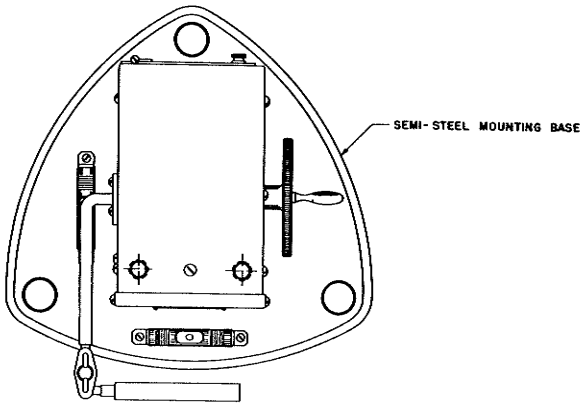
The instrument unit is assembled to a heavy cast iron base. Three leveling screws are provided in the base for leveling the unit, the level position being indicated by two individual levels.

34FB2TM & 34MB2TM

Meriam Micromanometers


¼" N.P.T. HIGH PRESSURE CONNECTION
¼" N.P.T. LOW PRESSURE CONNECTION
THERMOMETER -18° TO 105° C
MANOMETER SCALE GRADUATED INCHES AND TENTHS
REFERENCE CALIBRATING POINT FOR INDICATING FLUID MENISCUS
ADJUSTABLE MAGNIFIER
WELL POSITION INDICATOR
CLEAR PLASTIC COVER
WELL POSITION INDICATOR SCALE GRADUATED INCHES AND TENTHS
ACCESS DOOR FOR SCALE ZERO WELL ADJUSTMENT & FILLING
PYREX GLASS TUBE
MANOMETER SCALE GRADUATED INCHES AND TENTHS
MICROMETER WHEEL GRADUATED .001"
WELL POSITIONING HAND-WHEEL
PRECISION LEVEL
LEVELING SCREW
LOCK NUT
A

MERIAM MODEL 34FB2TM
MICROMANOMETER



Range Inches of Water	A	Approx. Shipping Weight
10	36"	145 lbs.
20	60"	200 lbs.

Range mm	A	Approx. Shipping Weight
254	914 mm	65.8 kg
508	1524 mm	90.7 kg

Specifications		
Type	Micromanometer	
Range	10", 20"	
Pressure Rating	20 PSIG	
Mounting	Table stand with two levels and leveling screws	
Indicating Tube & Packing	Borosilicate glass and neoprene	
Body Construction	Aluminum Frame	
Wetted Parts Material	Stainless Steel	
Scale Finish	White non-glare, black graduations	
Finish	Baked Black Crackle	
Scale Graduations	Model 34FB2: English Units Scale: Inches & Tenths Micrometer Wheel: .001"	Model 34MB2: Metric Units Scale: Millimeters Micrometer Wheel: 0.01 mm
Special Features	Micrometer wheel for readings to .001" or 0.1 mm Magnifier for easy reading Thermometer mounted in case	
Weight	10" range – 145 lbs. 20" range – 200 lbs.	
Indicating fluid	Meriam 1000 Green Concentrate with water; 4 ounces required to fill (initial fill supplied with instrument)	

Ordering Information

To order a Meriam micromanometer custom-made to your specifications, please contact your Meriam sales representative with the following information:

- Range
- Indicate English or Metric Units

Accessories

Model Z971 A3 Pressure-Vacuum Variator

Manometer Accessories, Indicating Fluids & Pressure Sources

Accessories

Pressure / Vacuum Variator - 971A3
This can produce -10 PSIG to 30 PSIG (-.69 to 2.0 Bar) or 12" to 20" Hg (300 to 500mm Hg) vacuum. Max. Pressure is 20 PSIG (1.3 Bar) when used with other pressure sources. A table stand is available for bench top usage. Connections are ¼" FNPT.

Hand Pumps - B34686 (pressure); B34700 (vacuum)
These are available in 2 models, Pressure or Vacuum. The pressure pump generates a positive pressure up to 145 PSIG, while the vacuum pump generates a vacuum of 650mm Hg. Both units feature a needle bleed valve and a multi-turn vernier, which provides precise adjustment. Connections are ⅛" FNPT.

Line Traps - 932 Series
Line Traps are an inexpensive means to keep manometers and indicating fluids clean and are recommended for all installations. When installed in the line ahead of the manometer they permit entrained solids to settle out before they reach the manometer. When used with gases or vapors they trap moisture.

Sight Feed Bubblers - 931 Series
Bubblers provide a visual indication of flow by showing air or gas bubbles discharging from a dip tube immersed in a liquid in a transparent bowl. The bubble rate is controlled by a stainless steel needle valve in the head casting.

Bubblers and Line Traps are available with heavy wall transparent bowls made of either plastic or glass. They are rated at 100 PSI and 50 PSI respectively. Either a ring type or strap type configuration is available for securing the bowl to the head.

Float Check Valve - 942K50 (standard);
942KW50 (indicating fluid under water)
This is a most valuable accessory small enough to be installed on each tube of a multiple tube manometer, yet fully dependable. Normal operation of the manometer is not impaired by vertical installation of the float check valve. If pressure increases beyond the instrument range, the valve closes preventing the fluid from leaving the manometer. The valve opens when normal pressure is restored. Maximum operating pressure is 500 PSIG.

Return Wells - 934H50
These are stainless steel and for use on manometers with operating pressures up to 500 PSIG. The indicating fluid is trapped during manometer over pressure. Fluid will drain back into the manometer when normal pressure is returned.

Seal Pots - 953AA75
Meriam Seal Pots are used to provide a constant liquid head on each side of a flow meter involving steam or other condensable vapors. They also isolate the instrument from the process with a sealing liquid.

All Meriam Seal Pots are fabricated from grade A seamless steel pipe. Each unit is cold hydraulic tested to over twice its rated working pressure. All connections are ½" NPT furnished with solid steel plugs. The finish is red oxide primer.

Manometer Accessories & Indicating Fluids

Fluids

Meriam indicating fluids are available for a wide variety of needs. Low freeze point fluids are available for cold weather climates and outdoor use. High temperature fluids are also available for higher temperature environments. Indicating fluid specific gravity (density) options range from 0.827 Red Oil to 2.95 Red Fluid. The higher specific gravity fluids can be used to increase the measurement range of any glass tube manometer.

Ordering Information

To order any one of Meriam's indicating fluids, please contact your Meriam sales representative with the fluid's corresponding order number (see chart).

Trade Name	Specific Gravity	Description	Order No.	Quantity
827 Red Oil	0.827 @ 60ºF Compared to H_20 @ 4ºC	A highly refined mineral seal oil, non-corrosive. Temp Range: 40ºF to 120ºF	923RO-1 923RO-2 923RO-3 923RO-4	4 oz. 1 pt. 1 qt. 1 gal.
1000 Green Concentrate	1.000	For high precision work. Non-corrosive, low surface tension. Not for use under freezing conditions (see 922WA-LFP below). Concentrated to mix with water.	922WA-1 922WA-2	3 oz. 15 oz.
1000-LFP Low Freezing Point Green Concentrate	1.00	Similar to Meriam 1000 Green Concentrate, however, fluid is premixed with ethylene glycol. Temp Range: 0ºF to 120ºF	922WA-LFP	1 pt. 1 gal.
1000 Certified Premixed Green Concentrate	1.000	Premixed blend of Green Concentrate & Distilled water with certificate of specific gravity value. Temp Range: 40ºF to 120ºF	922WA-SP	1 qt. 1 gal.
100 Red Unity Oil	1.00 @ 73ºF Compared to H_20 @ 4ºC	A mineral seal oil for general use where water is unsuitable. Temp Range: 30ºF to 100ºF	923RU-1 923RU-2 923RU-3 923RU-4	4 oz. 1 pt. 1 qt. 1 gal.
104 Hi-Vac Red Fluid	1.04 @ 83ºF Compared to H_20 @ 4ºC	Specially suited for high vacuum applications. Teflon gaskets are required. Insoluble in water, non-corrosive. Temp Range: 20ºF to 150ºF	929DB-1 920DB-2 929DB-3 929DB-4	4 oz. 1 pt. 1 qt. 1 gal.
190 Blue Fluid	1.90 @ 55ºF Compared to H_20 @ 4ºC	Non-Freezing, low viscosity. Insoluble in water, clear interface. Temp Range: -30ºF to 120ºF	923BFL-1	2 oz.
295 No. 3 Red Fluid	2.95 +/- 0.002 @ 78ºF Compared to H_20 @ 4ºC	Heavy Bromide, Non-Flashing. Highly corrosive to steel & aluminum. Temp Range: 40ºF to 100ºF	924BA-1 924BA-1#Exp 924BA-3# 924BA-3#Exp	1 lb. 1 lb. export 3 lb. 3 lb. export
Cleaning Fluid	—	Manometer Cleaning Fluid Alkaline & Detergents	915E	1 gal.

Meriam's hand pumps can be used with a variety of products such as our manometers, Model 35EE Meri-Cal, MFT Series, M2 Series Smart Manometers and the M1 Series Digital Manometer/Calibrators. See pages 54-55 for more information.

MH-10KT

MP-100 KT

M-600 KT

MH-10KT Hydraulic Calibration Pump

- 0-10,000 psi (700 Bar)
- Compatible with most hydraulic fluids, oils, and water
- Connections (2 ports) ¼ inch NPT/BSP
- Weight 3 lbs

MP-100KT Calibration Pump

- MV-100 0-28'' Hg (depends on barometric pressure)
- MP-100 0 to 100 psi (including and not limited to an inch of water)
- Connections (2 ports) ⅛ inch NPT
- 2ft hose and ¼ inch fitting

M-600KT Combo Pneumatic Calibration Pump

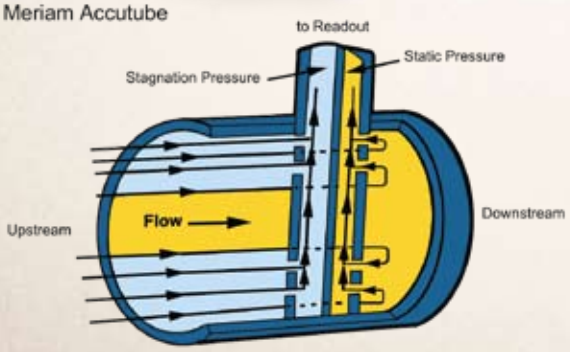
- Vacuum 28" Hg to pressure 600 psi (combination pump)
- Compatible with all gauges and calibrators
- Connections (2 ports) ¼ inch and ⅛ inch NPT/BSP
- Weighs 2 lbs

Orifice Plates & Accutubes

Meriam's Accutube Flow Sensors are lab-tested and field-proven flow elements perfect for gas, liquid or steam service. With thousands in use worldwide, the Accutube continues to be the right choice when ease of installation, cost effective operation and highly accurate performance is required.

The Accutube averaging Pitot tube is a head type device, which generates a differential pressure signal similar to the orifice, venturi, flow nozzle, and other head producing primary elements. It can be used for flow measurement only or with static pressure and temperature transmitters as the primary measurement source for a flow control loop. It has been proven that the Accutube's flow measurement accuracy is better than that of the orifice. The Accutube also generates considerable cost savings with its simple installation and wear-free, energy-efficient design, providing a viable alternative to traditional flow measurement devices.

Meriam Accutube



Accuracy

- True double averaging design
- +1% of rate accuracy
- +0.1% repeatability
- Tested and certified by independent flow labs

Convenience

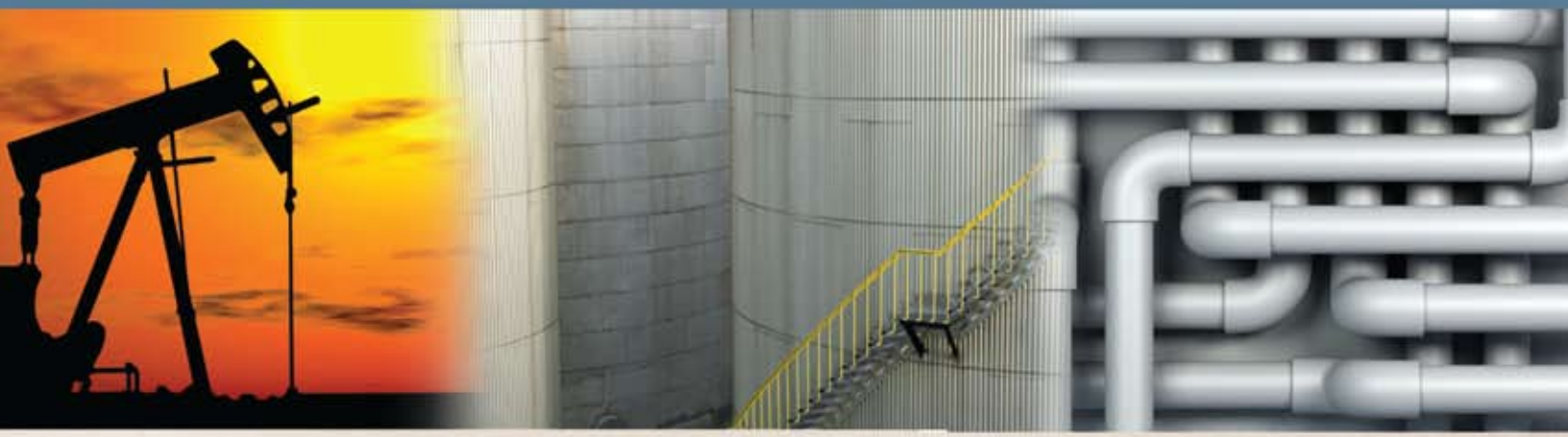
- Applicable to gases, liquids, steam
- Simple installation and maintenance
- Four standard models and probe sizes: Insertion, Flanged, Wet tap with socket or gear drive retraction, Integral three-valve manifold, optional
- Bi-directional flow sensing

Confidence

- Testing by the Utah Research Laboratory-Utah State University, the University of Michigan and testing against NIST traceable Meriam flow elements confirm typical accuracy of ±1% of rate
- Material Certification and Certificate of Conformance per customer specification are available
- Certified welding fabrication to ASME Code, Section IX Procedures.
- Dye penetrant and hydrostatic testing capability
- Canadian registration number

Efficiency

- Low permanent head loss saves energy and cost
- Multiple tube design offers superior strength and clog resistance
- Unaffected by wear
- No system shutdown with wet tap model
- Ideal for flow system upgrades and expansions
- Integral 3-Valve head option saves installation piping and transmitter mounting time
- Gear Drive wet tap reduces insertion and retraction time



	Inline Mounting	Insertion Mounting		Flange Mounting	Wet Tap Mounting	
	10A, 11A, 12A	20T & 21T	22L & 23L	24D & 25D	33T	37L
	10A & 11A 12A	20T for Moderate Velocity 21T for High Velocity Flows	22L for Moderate Velocity 23L for High Velocity Flows	24D for Moderate Velocity 25D for High Velocity Flows		
Type	In-Line Flowmeter	Low Pressure Probe	High Pressure Probe	Flange Mount	Low Pressure Wet-Tap	High Pressure Wet-Tap
MATERIALS Probe & Head	Brass, Steel PVC or 316SS	Brass head with 316SS Probe (316 Head Optional)	316SS	316SS on ½" & 1" Dia. Probe 316SS on 2⅜" Dia. Probe	Brass Head with 316SS Probe (316SS Head Optional)	316SS on ½" & 1" Dia. Probe 316SS on 2⅜" Dia. Probe
Trim	Brass is standard on all except 316SS and PVC bodies.	316SS	316SS	Not Applicable	Carbon Steel and Brass	Carbon Steel and Stainless
Packing	Not Applicable	Brass, 316SS	316SS	Spiral Wound 304SS/ ABS Gasket	Brass Packing/ Nylon Ferrule	Grafoil Rings/ 316SS Housing
Insertion Valve	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Brass or 316SS Ball Valve	Carbon Steel or 316SS Ball or OS&Y valve
PROBE SUPPORT(S)	Single support on all models	20T Series are single support 21T Series are double support	22L Series are single support 23I Series are double support	24D Series are single support 25D Series are double support	Single support	Single support
CONNECTIONS	⅛" FNPT	⅛" FNPT	½" MNPT	½" FNPT	⅛" FNPT	½" MNPT
PRESSURE RATING	Brass, Copper & Steel body: 250 PSIG max. @ 250ºF max. 316SS body: 1000 PSIG max @ 750ºF max. PVC body: 120 PSIG @ 100ºF max.	Brass Packing: 1500 PSIG max. @ 100ºF, 250 PSIG @ 400ºF. 316SS Packing: 2500 PSIG max. @ 100ºF, 2000 PSIG @ 800ºF max.	1500 PSIG max. @ 800º F max.	Based on type and weight of flange selected. Refer to ANSI Spec B16.5 for pressure and temperature rating of material.	Operating: 150 PSIG max. @ 190ºF max Insertion/Removal: 100 PSIG or less @ 190ºF max.	Probe Design is 1000 PSIG max. @ 800ºF max. Actual rating depends on type of insertion valve selected.
LINE SIZES	½" through 3"	1" through 42"	2" through 72"	2" through 72"	1" through 30"	2" through 72"
PROBE DIAMETERS	3/16" for ½" and ¾" Pipe ¼" for 1" through 3" Pipe	⅜" for 1" and 10" Pipe ¾" for 6" through 42" Pipe	½" for 2" and 10" Pipe 1" for 6" through 72" Pipe	½" for 2" and 10" Pipe 1" for 6" through 42" Pipe 2⅜" for 14" and 72" Pipe	⅜" for 1" and 10" Pipe ¾" for 6" through 30" Pipe	½" for 2" and 10" Pipe 1" for 6" through 42" Pipe 2⅜" for 14" and 72" Pipe
MOUNTING STYLES	Standard: MNPT thread, Copper body is solder type. Options: flanged or butt weld	Standard: C.S. weld coupling Options: 316SS or PVC coupling. Saddle clamp or duct mount.	Standard: C.S. weld coupling Options: 316SS or PVC coupling. Saddle clamp or duct mount.	Standard: 150# Carbon Steel flange and weld coupling. Options: 150, 300, 600 or 900# Carbon Steel or 316SS flange.	Standard: C.S. weld coupling. Options: 316SS or PVC Pipe coupling. Saddle clamp.	Standard: C.S. weld coupling. Options: 316SS weld coupling and trim material.

Orifice Plates & Flanges

Considered the most common primary element, Meriam's concentric orifice plates are precision bored to exact dimensions with a sharp upstream edge to ensure accuracy. Pair this up with an orifice flange to provide a convenient, accurate method for installing orifice plates.

Model 951

Orifice Plates
Concentric-Segmental-Eccentric

The most common primary flow element is the concentric orifice plate, often called the “sharp-edged” orifice plate. Its main advantages are: low cost, accuracy, ease of installation, variety of construction material and quick delivery. Much test data has been compiled about orifice plates and, with the necessary information, an exacting design can be made providing for excellent metering accuracy.

Engineered for each application, Meriam orifice plates are precision bored to exact dimensions with a sharp upstream edge to ensure accuracy. Orifice information is stamped on the unique handle. This handle is designed to facilitate storage of the plate without damage to the orifice bore.

Standard Meriam orifice plates are 304 Stainless Steel. Monel, brass, P.V.C., 316 Stainless Steel and other materials are available. Meriam orifice plate dimensions meet ISA specifications. Meriam can provide blank orifice plates for your own boring, too.

Whether you size the bore or you want us to, consult Meriam for your next requirement.

Orifice Plates Design Criteria & Tolerances

Standards and specifications for orifice plates are listed by the ISA, AGA and ASME. All of these do not agree in all ways. Please indicate which specifications you require so we will provide your orifice plates the way you want them.

Edges – Square and sharp, will not reflect a beam of light when viewed without magnification.

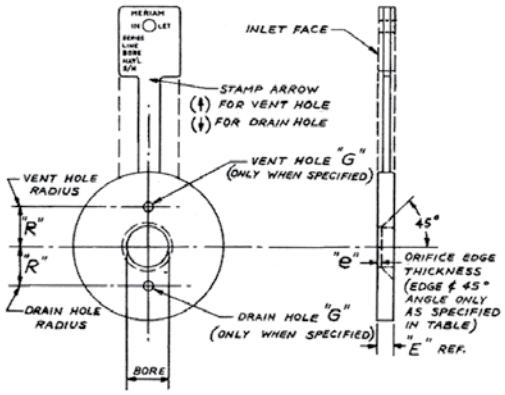
Finish – 15-32 micro-inch roughness

Flatness – Flatness within 0.010 inches, per inch of dam height.

Bore – Orifice bore tolerance in strict accordance with AGA. Gas Measurement Committee Report No. 3, ASME Fluid Meters Committee Report, and with other societies’ recommendations.

Meriam has furnished many orifice plates for nuclear and fossil fired power plants, chemical plants, refineries, steel mills and to original equipment manufacturers for incorporation in their equipment and systems.

Meriam can also provide readout instruments and accessories for complete flow metering installation.



Orifice Edge Thickness

Line Pipe Size	½”-1½”	2” - 3”	3½”-6”	8”-12”	14”-36”
Orifice Edge Thickness “e”	1/64”	1/32”	1/16”	1/8”	1/4”

Model 951

Orifice Plates Concentric-Segmental-Eccentric

Tolerances for Orifice Bore

Orifice Bore	Plus or Minus Tolerances
Less Than .250”	.0003
.250” to .499”	.0004
.500” to 1.999”	.0005
2.000” to 3.999”	.0010
4.000” to 9.999”	.0020
10.000” to 19.999”	.0050
20.000” & up	.0100

Vent/Drain Hole Diameter

Orifice Bore	Vent or Drain Holes “G”
Less than 1.000”	None
1.000 to 3.500”	3/32”
3.501 to 4.125”	1/8”
4.126 to 5.000”	5/32”
5.001 to 6.000”	3/16”
6.001 to 6.750”	7/32”
6.751 to 7.500”	1/4”
7.501 to 8.375”	9/32”
8.376 to 9.250”	5/16”
9.251 to 10.000”	11/32”
10.001 to 10.875”	3/8”
10.876 to 11.625”	13/32”
11.626 to 12.500”	7/16”
12.501 to 13.250”	15/32”
13.251” & larger	1/2”

Orifice Bore Calculations

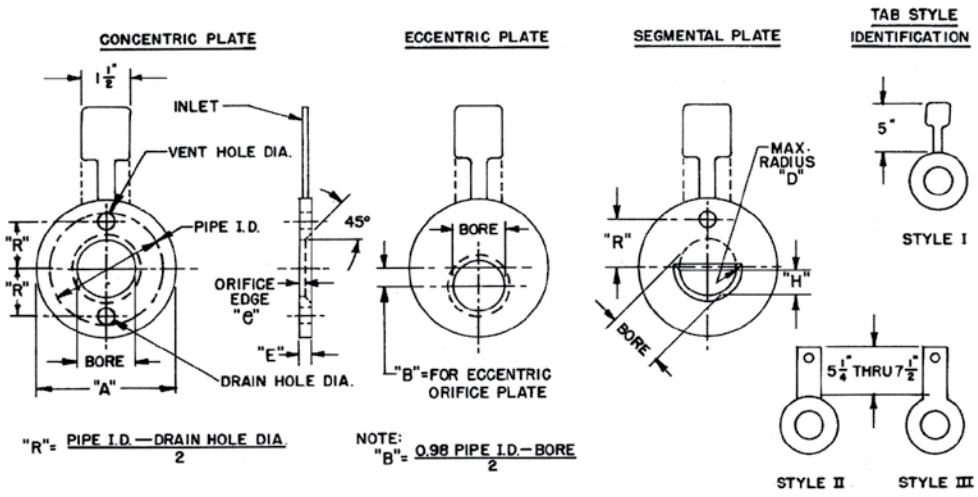
The Meriam Engineering Department will calculate orifice bore sizes utilizing an inhouse computer. Bore calculations are based on the LK. Spink precision bore calculations.

Tabulate your flow data and send it to Meriam with your order for precise bore sizing.

Ordering Information

To order Meriam’s Model 951 orifice plates custom-made to your specifications, please contact your Meriam sales representative with the following information:

- Flange Rating (either 300 or 150 PVC)
- Material
- Line Size
- Bore Dimensions, if available (if unknown, consult factory)



Dimensions Table

Meriam Model	Line Pipe Size	1/2”	3/4”	1”	1 1/4”	1 1/2”	2”	2 1/2”	3”	4”	5”	6”	8”	10”	12”	14”	16”	18”	20”	22”	24”
		“A” Orifice Plate O.D.																			
951C15	125-150# Series	1 7/8”	2 1/4”	2 5/8”	3”	3 3/8”	4 1/8”	4 7/8”	5 3/8”	6 7/8”	7 3/4”	8 3/4”	11”	13 3/8”	16 1/8”	17 3/4”	20 1/4”	21 5/8”	23 7/8”	26”	28 1/4”
951B30	250# Series / 300# Series	— / 2 1/8”	2 7/8” / 2 5/8”	2 7/8”	3 1/4”	3 3/4”	4 3/8”	5 1/8”	5 7/8”	7 1/8”	8 1/2”	9 7/8”	12 1/8”	14 1/4”	16 5/8”	19 1/8”	21 1/4”	23 1/2”	25 3/4”	27 3/4”	30 1/2”
951B40	400# Series	2 1/8”	2 5/8”	2 7/8”	3 1/4”	3 3/4”	4 3/8”	5 1/8”	5 7/8”	7”	8 3/8”	9 3/4”	12”	14 1/8”	16 1/2”	19”	21 1/8”	23 3/8”	25 1/2”	27 5/8”	30 1/4”
951B60	600# Series	2 1/8”	2 5/8”	2 7/8”	3 1/4”	3 3/4”	4 3/8”	5 1/8”	5 7/8”	7 5/8”	9 1/2”	10 1/2”	12 5/8”	15 3/4”	18”	19 3/8”	22 1/4”	24 1/8”	26 7/8”	28 7/8”	31 1/8”
951B90	900# Series	2 1/2”	2 3/4”	3 1/8”	3 1/2”	3 7/8”	5 5/8”	6 1/2”	6 5/8”	8 1/8”	9 3/4”	11 3/8”	14 1/8”	17 1/8”	19 5/8”	20 1/2”	22 5/8”	25 1/8”	27 1/2”	—	33”
951B150	1500# Series	2 1/2”	2 3/4”	3 1/8”	3 1/2”	3 7/8”	5 5/8”	6 1/2”	6 7/8”	8 1/4”	10”	11 1/8”	13 7/8”	17 1/8”	20 1/2”	22 3/4”	25 1/4”	27 3/4”	29 3/4”	—	35 1/2”
	Plate Thickness ‘E’ Meriam STD	1/8”	1/8”	1/8”	1/8”	1/8”	1/8”	1/8”	1/8”	1/8”	1/8”	1/8”	1/8”	1/8”	1/8”	1/4”	1/4”	1/4”	1/4”	1/4”	1/4”
	‘E’ AGA STD	—	—	—	—	—	1/8”	1/8”	1/8”	1/8”	1/8”	1/8”	1/8”	1/4”	1/4”	1/4”	3/8”	3/8”	3/8”	3/8”	3/8”
	‘E’ ISA STD	—	—	1/8”	1/8”	1/8”	1/8”	1/8”	1/8”	1/8”	1/8”	1/8”	1/8”	1/8”	1/8”	1/8”	1/4”	1/4”	1/4”	1/4”	1/4”
	ASME	1/8”	1/8”	1/8”	1/8”	1/8”	1/8”	1/8”	1/8”	1/8”	1/8”	1/4”	1/4”	1/4”	1/4”	1/4”	1/4”	1/4”	1/4”	1/4”	1/4”

Model 952

Orifice Flanges

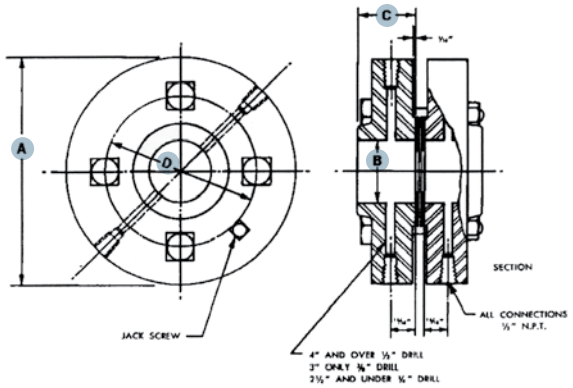
Meriam raised face orifice flange unions are designed to provide a convenient, accurate method for installing orifice plates. They incorporate accurately positioned pressure taps for connecting the flow measuring instruments. This eliminates the requirement of locating pressure taps in the field. Improper location of these taps will result in poor accuracy of the flow measuring system. These built-in taps also reduce field installation labor necessary for welding, drilling and/or tapping pressure taps on the flow line itself. Meriam orifice flanges are provided complete with nuts, bolts, gaskets and plugs for installation with no other parts required.

Ordering Information

When ordering Meriam's orifice flanges, simply choose to the part number on these pages that fits your application. Flange rating options are available in 300 or 150 PVC. Connection options include slip-on, weld neck or threaded.

Model 952 FS 30 – forged steel, slip-on welding; 300 lb. raised face

For systems where welded connections are required. These flanges are slipped over the pipe which is brought flush with the flange face. The pipe is then welded to the flange.



					Drilling Template					
Line Pipe Size	Flange O.D. A	Bore Dia. B	Hub Length C	Dia. Raised Face	No. of Holes	Dia. of Holes	Dia. of Bolts	Length of Bolts	Bolt Circle D	Approx. Union Weight
1	4⅞	1⅜	1⅞	2 13/16	4	11/16	⅝	4	3½	15 lbs.
1¼	5¼	1 23/32	1 13/16	3 3/16	4	11/16	⅝	4	3⅞	17 lbs.
1½	6⅛	1 31/32	1⅞	3 11/16	4	13/16	¾	4¼	4½	19 lbs.
2	6½	2 7/16	1 15/16	4 5/16	8	11/16	⅝	4	5	23 lbs.
2½	7½	2 15/16	2	5 1/16	8	13/16	¾	4¼	5⅞	31 lbs.
3	8¼	3 9/16	2 1/16	5 13/16	8	13/16	¾	4¼	6⅝	39 lbs.
4	10	4 9/16	2⅛	7 1/16	8	13/16	¾	4¼	7⅞	60 lbs.
5	11	5 21/32	2⅛	8⅜	8	⅞	¾	4¼	9¼	70 lbs.
6	12½	6 23/32	2⅛	9¾	12	⅞	¾	4¼	10⅝	100 lbs.
8	15	8 23/32	2 7/16	12	12	1	⅞	4½	13	134 lbs.
10	17½	10⅞	2⅝	14⅛	16	1⅛	1	5¼	15¼	196 lbs.
12	20½	12⅞	2⅞	16½	16	1¼	1⅛	5½	17¾	281 lbs.
14	23	14 3/16	3	19	20	1¼	1⅛	5¾	20¼	380 lbs.
16	25½	16 3/16	3¼	21⅛	20	1⅜	1¼	6¼	22½	620 lbs.
18	28	18 3/16	3½	23⅜	24	1⅜	1¼	6½	24¾	691 lbs.
20	30½	20 3/16	3¾	25⅝	24	1⅜	1¼	6¾	27	781 lbs.
24	36	24 3/16	4 3/16	30⅜	24	1⅝	1½	7½	32	1201 lbs.

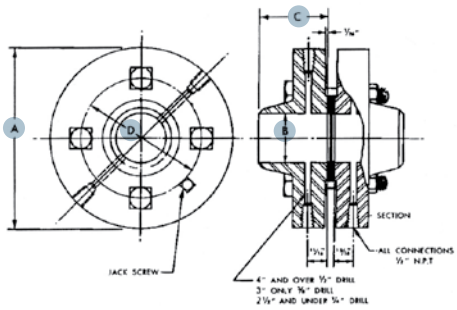
All Dimensions are in inches

Model 952

Orifice Flanges

Model 952 FW 30 - forged steel, welding neck; 300 lb. raised face

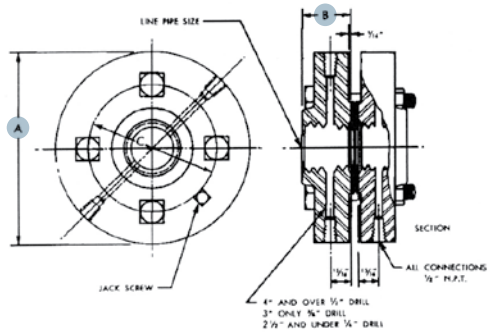
Similar to slip-on welding model but for use where weld neck is preferred. These flanges are butted up against the ends of the pipe and welded in place.



					Drilling Template					
Line Pipe Size	Flange O.D. A	Bore Dia. B	Hub Length C	Dia. Raised Face	No. of Holes	Dia. of Holes	Dia. of Bolts	Length of Bolts	Bolt Circle D	Approx. Union Weight
1	4⅞	1⅜	1⅞	2 13/16	4	11/16	⅝	4	3½	15 lbs.
1¼	5¼	1 23/32	1 13/16	3 3/16	4	11/16	⅝	4	3⅞	17 lbs.
1½	6⅛	1 31/32	1⅞	3 11/16	4	13/16	¾	4¼	4½	19 lbs.
2	6½	2 7/16	1 15/16	4 5/16	8	11/16	⅝	4	5	23 lbs.
2½	7½	2 15/16	2	5 1/16	8	13/16	¾	4¼	5⅞	31 lbs.
3	8¼	3 9/16	2 1/16	5 13/16	8	13/16	¾	4¼	6⅝	39 lbs.
4	10	4 9/16	2⅛	7 1/16	8	13/16	¾	4¼	7⅞	60 lbs.
5	11	5 21/32	2⅛	8⅜	8	⅞	¾	4¼	9¼	70 lbs.
6	12½	6 23/32	2⅛	9¾	12	⅞	¾	4¼	10⅝	100 lbs.
8	15	8 23/32	2 7/16	12	12	1	⅞	4½	13	134 lbs.
10	17½	10⅞	2⅝	14⅛	16	1⅛	1	5¼	15¼	196 lbs.
12	20½	12⅞	2⅞	16½	16	1¼	1⅛	5½	17¾	281 lbs.
14	23	14 3/16	3	19	20	1¼	1⅛	5¾	20¼	380 lbs.
16	25½	16 3/16	3¼	21⅛	20	1⅜	1¼	6¼	22½	620 lbs.
18	28	18 3/16	3½	23⅜	24	1⅜	1¼	6½	24¾	691 lbs.
20	30½	20 3/16	3¾	25⅝	24	1⅜	1¼	6¾	27	781 lbs.
24	36	24 3/16	4 3/16	30⅜	24	1⅝	1½	7½	32	1201 lbs.

Model 952 FT 30 – forged steel, threaded; 300 lb. raised face

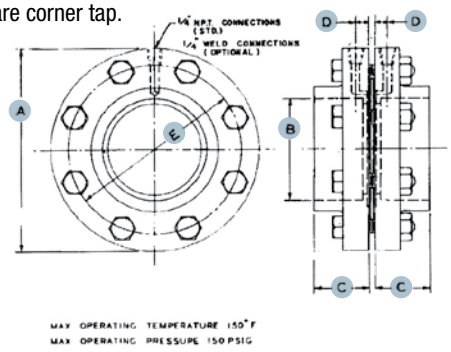
Designed for systems where threaded connections are suitable and conditions require forged steel.



				Drilling Template					
Line Pipe Size	Flange O.D. A	Hub Length B	Dia. Raised Face	No. of Holes	Dia. of Holes	Dia. of Bolts	Length of Bolts	Bolt Circle C	Approx. Union Weight
1	4⅞	1⅞	2 13/16	4	11/16	⅝	4	3½	15 lbs.
1¼	5¼	1 13/16	3 3/16	4	11/16	⅝	4	3⅞	17 lbs.
1½	6⅛	1⅞	3 11/16	4	13/16	¾	4¼	4½	19 lbs.
2	6½	1 15/16	4 5/16	8	11/16	⅝	4	5	23 lbs.
2½	7½	2	5 1/16	8	13/16	¾	4¼	5⅞	31 lbs.
3	8¼	2 1/16	5 13/16	8	13/16	¾	4¼	6⅝	39 lbs.
4	10	2⅛	7 1/16	8	13/16	¾	4¼	7⅞	60 lbs.
5	11	2⅛	8⅜	8	⅞	¾	4¼	9¼	70 lbs.
6	12½	2⅛	9¾	12	⅞	¾	4¼	10⅝	100 lbs.
8	15	2 7/16	12	12	1	⅞	4½	13	134 lbs.
10	17½	2⅝	14⅛	16	1⅛	1	5¼	15¼	196 lbs.
12	20½	2⅞	16½	16	1¼	1⅛	5½	17¾	281 lbs.

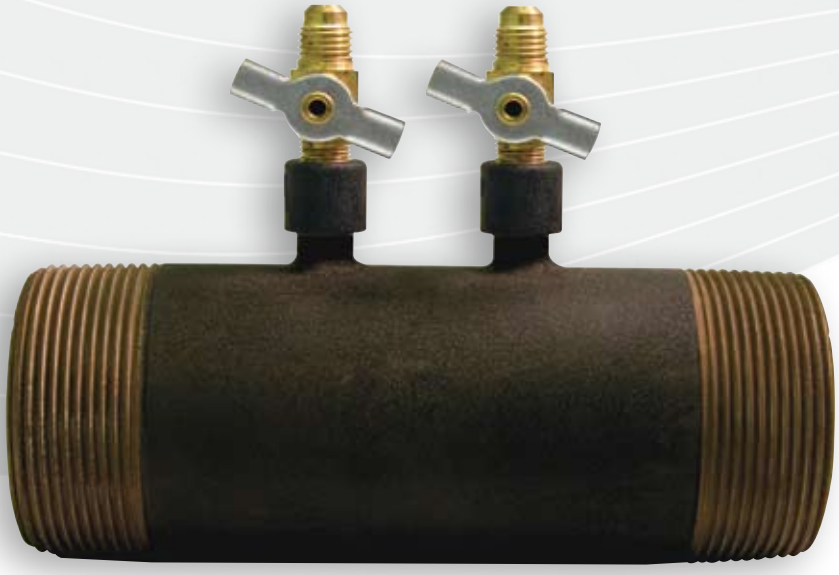
Model 952 PV 15 – PVC socket type; 150 lb. raised face

PVC orifice flanges are socket type where connecting line is solvent welded to flanges. Pressure connections are corner tap.



						Drilling Template					
Line Pipe Size	Flange O.D. A	Bore Dia. B	Hub Length C	D	No. of Holes	Dia. of Holes	Dia. of Bolts	Length of Bolts	Bolt Circle E	Approx. Union Weight
¾	4½	1.056	1¼	⅝	4	⅝	½	3½	2¾	1 lbs.
1	4½	1.320	1¼	⅝	4	⅝	½	3½	3⅛	1½ lbs.
1¼	5	1.665	1½	¾	4	⅝	½	4	3½	2 lbs.
1½	5	1.905	1½	¾	4	⅝	½	4	3⅞	2½ lbs.
2	6	2.380	1⅝	13/16	4	¾	⅝	4½	4¾	3 lbs.
2½	7	2.890	1⅞	15/16	4	¾	⅝	3	5½	4½ lbs.
3	7½	3.515	2	½	4	¾	⅝	3½	6	5 lbs.
4	9	4.515	2⅜	½	8	¾	⅝	3½	7½	7 lbs.
6	11	6.640	3¼	9/16	8	⅞	¾	3½	9½	11 lbs.

All Dimensions are in inches



Series 10A & 11A

Accutube

SERIES 10A inline sensors are supplied in threaded Schedule 40 pipe nipples (except for the type "K" Copper). The inline sensor is complete with factory-fitted probes and is supplied as a complete assembly providing for economical installation. Series 10A sensors are supplied with Steel, 316SS, Brass and Type "K" copper. Available in line sizes ½" through 3".

SERIES 11A inline sensors are supplied in threaded Schedule 80 pipe nipples (except for the PVC plain end type). The inline sensor is complete with factory-fitted probes and is supplied as a complete assembly providing for economical installation. Series 11A sensors are supplied with Steel, 316SS, Brass, and PVC. Available in line sizes ½" through 3".

- Inline for ease of installation and low cost
- Gas, liquid and steam applications
- Line sizes from ½" - 3"
- Available in steel, stainless, brass, copper and PVC
- Pressure / temperature to: 1000 PSIG @ 750°F

Series 10A & 11A

Accutube

Customizing a Meriam Accutube to fit your application couldn't be easier. Simply review the options below and create your unique part number. Contact Meriam with this information and place your order. It's that simple!

Model Number

1 0 A
1 1 A - _ _ _ _ F - _ _ - _ _

Model Code

10A for Sch 40 Pipe and Type K Copper 11A for Sch 80 pipe and PVC

Body Material

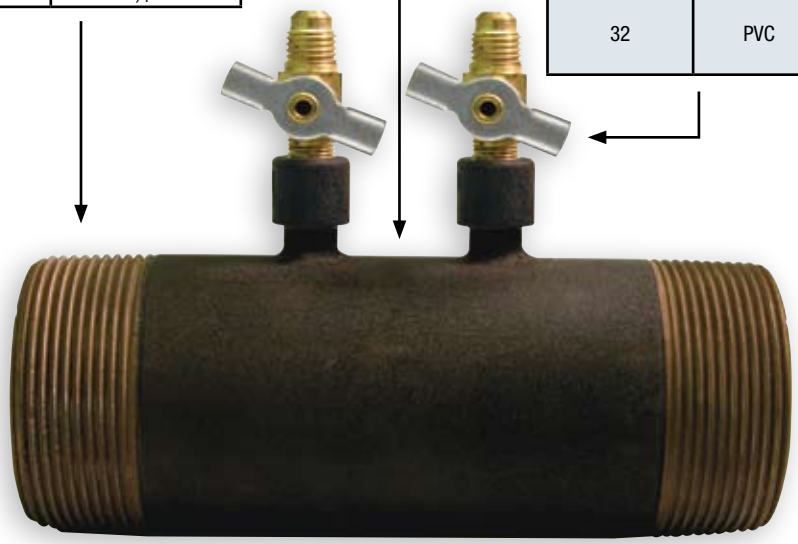
Body Material	Order Code	Rating
Brass	10	250 PSIG @ 250˚F Max.
Steel	02	
Type K Copper	14	
316SS	03	1000 PSIG @ 750˚F Max.
PVC threaded	30	120 PSIG @100˚F Max.
PVC plain end	31	

Line Size and Probe Diameter

Line Size	Order Code	Probe Diameter
½"	0005 F	3/16"
¾"	0007 F	3/16"
1"	0010 F	¼"
1¼"	0012 F	¼"
1½"	0015 F	¼"
2"	0020 F	¼"
2½"	0025 F	¼"
3"	0030 F	¼"

Instrument Shutoff Valves

Order Code	Material	Description
XX	–	No Valves Required Instrument connections are ⅛" FNPT except PVC ½" FNPT
00	Brass	⅛" MNPT x ¼" SAE Flair rated for 150 PSIG @ 200˚F Max.
03	316SS	⅛" MNPT x ⅛" MNPT 90˚ connection. Rated for 2000 PSI @ 450˚F Max.
32	PVC	½" FNPT x ½" FNPT BALL type. Rated for 120 PSIG @ 100˚F max. Series 11A only.



Series 20T & 21T

Accutube

Series 20T Accutube - Single Mount. The Accutube Series 20T Standard Probe is constructed of stainless steel and brass. The Probe has single-mounted support and installs through a single packing gland and thredolet. The Accutube is factory-fitted with ⅛" FNPT connections and is shipped with mounting hardware complete. The Series 20T Accutubes are available for line sizes 1" through 30".

Series 21T Accutube - Double Mount. The Accutube Series 21T standard probe is constructed of stainless steel and brass and is double supported. This Accutube is provided complete with packing gland and two thredolets. The Accutube is factory-fitted with ⅛" FNPT connections and is shipped with mounting hardware complete. The Series 21T Accutubes are available for line sizes 3" through 42".

- Insertion type flow sensor
- Gas, liquid and steam applications
- Standard sizes up to 42" pipe
- Pressures to 1500 PSIG, temperatures to 800ºF

Series 20T & 21T

Accutube

Customizing a Meriam Accutube to fit your application couldn't be easier. Simply review the options below and create your unique part number. Contact Meriam with this information and place your order. It's that simple!

Model Number

2 0 T
2 1 T - _ _ _ _ _ - 0 0 - _ _ - x x - _ _

Model Code

20T - Single Mount
21T - Double Mount

Body Material

Body Material	Order Code
STD 316SS Probe with Brass Head	00
316SS Probe with 316SS Head	03

Line Size and Probe Diameter

Line Size	Order Code ⅜" Dia. Probe	Order Code ¾" Dia. Probe
1" 1¼" 1½"	0010D 0012D 0015D	— — —
2" 2½" 3"	0020D 0025D 0030D	— — —
3½" 4" 5"	0035D 0040D 0050D	— — —
6" 8" 10"	0060D 0080D 0100D	0060E 0080E 0100E
12" 14" 16"	— — —	0120E 0140E 0160E
18" 20" 22"	— — —	0180E 0200E 0220E
24" 26" 28"	— — —	0240E 0260E 0280E
30" 32" 34"	— — —	0300E 0320E 0340E
36" 42"	— —	0360E 0420E

Above 42" use 22L, 23L or consult factory.

Instrument Shutoff Valves

Order Code	Material	Description
XX	—	No valves required. Connections are ⅛" FNPT
00	Brass	⅛" MNPT x ¼" SAE Flair rated for 150 PSIG @ 200ºF Max.
02	Steel	⅛" FNPT x ⅛" FNPT 90º connection rated for 6000 PSI @ 500ºF Max.
03	316SS	⅛" MNPT x ⅛" MNPT 90º connection rated for 2000 PSI @ 450ºF Max.

Mounting Hardware

Order Code	Packing Material	Mounting Material	Line Size	Pressure/Temperature Ratings
01	Brass	C.I. Saddle Clamp C.I. Saddle Clamp Steel Strap Type Steel Strap Type	1"-5" 6"-10" 12"-18" 20"-30"	Brass Packing 1500 PSIG Max. @ 100˚F 250 PSIG @ 400˚F Max.
02	Brass	C.S. Thredolet	All	
03	316SS	C.S. Thredolet	All	
04	316SS	316SS Thredolet	All	
06 07	Brass	C.S. Duct Mount 06 = Round 07 = SQ or Rect.	2"-24" 26"-42"	3/8" Stainless Steel Packing 2500 PSIG Max. @ 100˚F 2000 PSIG @ 800˚F Max.
S6 S7	316SS	C.S. Duct Mount S6 = Round S7 = SQ or Rect.	2"-24" 26"-42" 26"-42"	3/4" Stainless Steel Packing 3100 PSIG Max. @ 100°F 2000 PSIG @ 800°F Max.
08	Brass	PVC Thredolet	1"-24" 26"-42"	

Series 22L & 23L

Accutube

Series 22L Accutube - Single Mount. The Accutube Series 22L Probe is constructed of a 316LSS cast head and a 316LSS probe. The Series 22L probe has single-mounted support and installs through a single packing gland and thredolet. The Series 22L Accutube is factory-fitted with ½" NPT connections and is shipped with mounting hardware complete. Series 22L Accutubes are available for line sizes 2" through 42".

Series 23L Accutube - Double Mount. The Accutube Series 23L probe is constructed of a 316LSS cast head and a 316LSS probe and is double supported. The Accutube is provided complete with packing gland and two thredolets. The Series 23L Accutube is factory-fitted with ½" NPT connections and is shipped with mounting hardware complete. Series 23L Accutubes are available for line sizes 2" through 72".

- High pressure / temperature insertion type flow sensor
- Gas, liquid and steam applications
- Standard sizes up to 72" pipe
- Pressure / temperature limit: 1500 PSIG Max. @ 800ºF

Series 22L & 23L

Accutube

Customizing a Meriam Accutube to fit your application couldn't be easier. Simply review the options below and create your unique part number. Contact Meriam with this information and place your order. It's that simple!

Model Number

22 L
23 L - _ _ _ _ _ - 0 0 - _ _ - x x - _ _

Model Code

22L - Single Mount
23L - Double Mount

Body Material

Body Material	Order Code
316SS Head & Probe	03
For special material consult factory	SP

Instrument Shutoff Valves

Order Code	Description	Pressure/Temperature Rating
XX	No Instrument valves	Connections are ½" MNPT
00	Bronze gate valves, ½" FNPT x ½" FNPT	300 PSI Stream Max. @ 550ºF 600 PSI liquid @ 200ºF nonshock
02	Carbon steel block valve, ½" FNPT x ½" FNPT	6000 PSI max. @ 200ºF 4000 PSI @ 500ºF Max.
03	316SS block valve, ½" FNPT x ½" FNPT	6000 PSI max. @ 200ºF 4000 PSI @ 500ºF Max.
04	Carbon steel OS&Y valve, ½" FNPT x ½" FNPT	2000 PSI max. @ 100ºF 235 PSI @ 1000ºF Max.
05	316S OS&Y valve, ½" FNPT x ½" FNPT	1920 PSI max. @ 100ºF 550 PSI @ 1200ºF Max.
SP	As required	For temp or press above those listed

Line Size and Probe Diameter

	Order Code			
	22L Single		23L Double	
Line Size	½" Dia. Probe	1" Dia. Probe	½" Dia. Probe	1" Dia. Probe
2"	0020A	—	0020A	—
2½"	0025A	—	0025A	—
3"	0030A	—	0030A	—
3½"	0035A	—	0035A	—
4"	0040A	—	0040A	—
5"	0050A	—	0050A	—
6"	0060A	0060B	0060A	0060B
8"	0080A	0080B	0080A	0080B
10"	0100A	0100B	0100A	0100B
12"	—	0120B	—	0120B
14"	—	0140B	—	0140B
16"	—	0160B	—	0160B
18"	—	0180B	—	0180B
20"	—	0200B	—	0200B
22"	—	0220B	—	0220B
24"	—	0240B	—	0240B
26"	—	0260B	—	0260B
28"	—	0280B	—	0280B
30"	—	0300B	—	0300B
32"	—	0320B	—	0320B
34"	—	0340B	—	0340B
36"	—	0360B	—	0360B
42"	—	0420B	—	0420B
48"	—	—	—	0480B
60"	—	—	—	0600B
72"	—	—	—	0720B

Above 72" consult factory.

Mounting Hardware

Order Code	Packing Material	Mounting Material	Line Size
01	316SS	C.I. Saddle Clamp C.I. Saddle Clamp Steel Strap Type Steel Strap Type	2"-5" 6"-10" 12"-18" 20"-30"
03	316SS	C.S. Thredolet	All
04	316SS	316SS Thredolet	All
06 07	316SS	C.S. Duct Mount 06 = Round 07 = SQ or Rect.	2"-24" 26"-42"
S6 S7	316SS	C.S. Duct Mount S6 = Round S7 = SQ or Rect.	2"-24" 26"-42" 26"-42"
08	316SS	PVC Thredolet	1"-24" 26"-42"

Series 24D & 25D

Accutube

Series 24D Accutube - Single Mount. The Accutube Series 24D Standard Probe is constructed of a 316LSS probe and a 316SS flange. The instrument flange is 1¼" 150# ANSI flange standard (2⅜" probe has 2½" 150# flange.) The Series 24D probe is single-mount supported and installs through a carbon steel mounting flange and weldolet. The Series 24D Accutube is factory-fitted with ½" FNPT connections and is shipped with mounting hardware complete. Series 24D Accutubes are available for line sizes 2" through 72".

Series 25D Accutube - Double Mount. The Accutube Series 25D standard probe is constructed of a 316LSS probe and a 316SS instrument flange. The instrument flange is 1¼" 150# ANSI flange standard (2⅜" probe has 2½" 150# flange). The Series 25D probe is double mount-supported. This Accutube is provided complete with mounting flange and weldolet and a thredolet for double mounting. The Series 25D Accutube is factory fitted with ½" FNPT connections and is shipped with mounting hardware complete. Series 25D Accutubes are available for line sizes 2" through 72".

- High pressure / temperature insertion type flow sensor
- Gas, liquid and steam applications
- Standard sizes up to 72" pipe
- Pressure / temperature limit: 1500 PSIG Max. @ 800ºF

Series 24D & 25D

Accutube

Customizing a Meriam Accutube to fit your application couldn't be easier. Simply review the options below and create your unique part number. Contact Meriam with this information and place your order. It's that simple!

Model Number

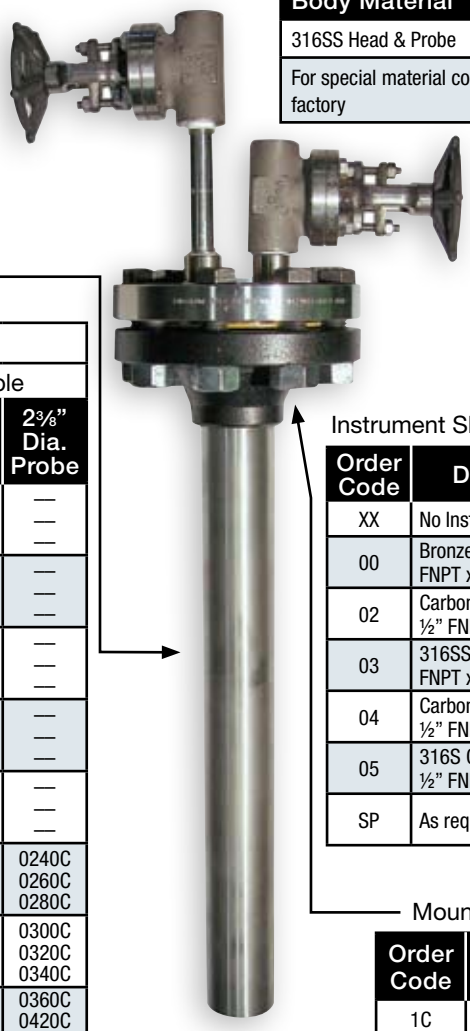
24D / 25D - _____ - 03 - __ - xx - __

Model Code

24D - Single Mount
25D - Double Mount

Body Material

Body Material	Order Code
316SS Head & Probe	03
For special material consult factory	SP



Line Size and Probe Diameter

Line Size	Order Code: 24D Single ½" Dia. Probe	24D Single 1" Dia. Probe	24D Single 2⅜" Dia. Probe	24D Double ½" Dia. Probe	24D Double 1" Dia. Probe	24D Double 2⅜" Dia. Probe
2"	0020A	—	—	0020A	—	—
2½"	0025A	—	—	0025A	—	—
3"	0030A	—	—	0030A	—	—
3½"	0035A	—	—	0035A	—	—
4"	0040A	—	—	0040A	—	—
5"	0050A	—	—	0050A	—	—
6"	0060A	0060B	—	0060A	0060B	—
8"	0080A	0080B	—	0080A	0080B	—
10"	0100A	0100B	—	0100A	0100B	—
12"	—	0120B		—	0120B	—
14"	—	0140B	0140C	—	0140B	—
16"	—	0160B	0160C	—	0160B	—
18"	—	0180B	0180C	—	0180B	—
20"	—	0200B	0200C	—	0200B	—
22"	—	0220B	0220C	—	0220B	—
24"	—	0240B	0240C	—	0240B	0240C
26"	—	0260B	0260C	—	0260B	0260C
28"	—	0280B	0280C	—	0280B	0280C
30"	—	0300B	0300C	—	0300B	0300C
32"	—	0320B	0320C	—	0320B	0320C
34"	—	0340B	0340C	—	0340B	0340C
36"	—	0360B	0360C	—	0360B	0360C
42"	—	0420B	0420C	—	0420B	0420C
48"	—	—	0480C	—	0480B	0480C
60"	—	—	0600C	—	0600B	0600C
72"	—	—	0720C	—	0720B	0720C

Above 72" consult factory.

Instrument Shutoff Valves

Order Code	Description	Pressure/Temperature Rating
XX	No Instrument valves	Connections are ½" MNPT
00	Bronze gate valves, ½" FNPT x ½" FNPT	300 PSI Stream Max. @ 550ºF 600 PSI liquid @ 200ºF nonshock
02	Carbon steel block valve, ½" FNPT x ½" FNPT	6000 PSI max. @ 200ºF 4000 PSI @ 500ºF Max.
03	316SS block valve, ½" FNPT x ½" FNPT	6000 PSI max. @ 200ºF 4000 PSI @ 500ºF Max.
04	Carbon steel OS&Y valve, ½" FNPT x ½" FNPT	2000 PSI max. @ 100ºF 235 PSI @ 1000ºF Max.
05	316S OS&Y valve, ½" FNPT x ½" FNPT	1920 PSI max. @ 100ºF 550 PSI @ 1200ºF Max.
SP	As required	For temp or pres above those listed

Mounting Components

Order Code	*Flange Rating	Material-weld Neck Flange Weldolet, Thredolet
1C	150#	Carbon Steel
3C	300#	Carbon Steel
6C	600#	Carbon Steel
9C	900#	Carbon Steel
1S	150#	316 Stainless Steel
3S	300#	316 Stainless Steel
6S	600#	316 Stainless Steel
9S	900#	316 Stainless Steel

Series 33T

Low Pressure Wet Tap Accutube

Series 33T Accutube Probe And Wet Tap Mounting Assemblies. Use of the 33T allows insertion and removal without process shutdown. The 33T probe consists of a standard brass head and a 316SS probe and installs through a wet tap assembly. The wet tap assembly consists of a packing gland, pipe nipple, insertion valve and thredolet or pipe saddle clamp. The 33T has ⅛" FNPT connections and is shipped with wet tap assembly and safety chain.

- Insertion and removal without process shut down
- Gas and liquid applications
- Standard sizes up to 30" pipe
- Operating pressure / temperature limit: 150 PSIG Max. @ 190°F max.
- Insertion / removal pressure / temperature limit: 100 PSIG @ 190°F

Have Questions?

Call our Technical Staff.
216-281-1100

Series 33T

Low Pressure Wet Tap Accutube

Customizing a Meriam Accutube to fit your application couldn't be easier. Simply review the options below and create your unique part number. Contact Meriam with this information and place your order. It's that simple!

Model Number

3 3 T - _ _ _ _ - 0 0 - _ _ - _ _ -

Body Material

Body Material	Order Code
STD 316SS Probe with Brass Head	00
316SS Probe with 316SS Head	03

Line Size and Probe Diameter

Line Size	Order Code: 3/8" Dia. Probe	Order Code: 3/4" Dia. Probe
1" 1¼" 1½"	0010D 0012D 0015D	— — —
2" 2½" 3"	0020D 0025D 0030D	— — —
3½" 4" 5"	0035D 0040D 0050D	— — —
6" 8"	0060D 0080D	0060E 0080E
10" 12" 14"	0100D — —	0100E 0120E 0140E
16" 18" 20"	— — —	0160E 0180E 0200E
22" 24" 26"	— — —	0220E 0240E 0260E
28" 30"	— —	0280E 0300E

Above 30" consult factory

Instrument Shutoff Valves

Order Code	Material	Description
XX	—	No valves required. Connections are ⅛" FNPT
00	Brass	⅛" MNPT x ¼" SAE Flair rated for 150 PSIG @ 200ºF Max.
02	Steel	⅛" FNPT x ⅛" FNPT 90º connection rated for 6000 PSI @ 500ºF Max.
03	316SS	⅛" MNPT x ⅛" MNPT 90º connection rated for 2000 PSI @ 450ºF Max.

Insertion Valves

Wet Tap	Description	Order Code
Series 53T	Brass valve and nylon packing	00
Series 54T	Brass valve and nylon packing	00
Series 55T	316SS valve and nylon packing	03

Mounting Hardware

Wet Tap	Description	Order Code
Series 53T	CS thredolet and pipe nipples	02
Series 54T	CI or CS saddle clamp, CS pipe nipples	01
Series 55T	316SS thredolet and pipe nipples	04

Series 37L

High Pressure Wet Tap Accutube

Series 37L Accutube. The Series 37L Accutube probe and Wet-Tap assembly provides the ability to access the pipe without service interruption. This Accutube assembly is supplied complete with two or more threaded jacking screws to allow insertion, withdrawal, and/or retention of the probe under full system pressure. The Series 37L Accutube and Wet-Tap Assembly is available for line sizes 2" through 72" and may be used in systems up to 1000 PSIG at 800°F Max.

- Insertion and removal without process shut down
  - Socket drive or gear drive
- Gas and Liquid applications
- Standard sizes up to 72" pipe
- Operating pressure / temperature limit: 1000 PSIG Max. @ 800°F max.

Series 37L

High Pressure Wet Tap Accutube

SD	Socket Drive
GD	Gear Drive

Customizing a Meriam Accutube to fit your application couldn't be easier. Simply review the options below and create your unique part number. Contact Meriam with this information and place your order. It's that simple!

Model Number

3 7 L - _ _ _ _ _ - 0 3 - _ - _ - _ - _

Body Material

Body Material	Order Code
316SS Head & Probe	03
For special material consult factory	SP

Line Size and Probe Diameter

Line Size	Order Code ½" Dia. Probe	1" Dia. Probe	2⅜" Dia. Probe
2"	0020A	—	—
2½"	0025A	—	—
3"	0030A	—	—
3½"	0035A	—	—
4"	0040A	—	—
5"	0050A	—	—
6"	0060A	0060B	—
8"	0080A	0080B	—
10"	0100A	0100B	—
12"	—	0120B	
14"	—	0140B	0140C
16"	—	0160B	0160C
18"	—	0180B	0180C
20"	—	0200B	0200C
22"	—	0220B	0220C
24"	—	0240B	0240C
26"	—	0260B	0260C
28"	—	0280B	0280C
30"	—	0300B	0300C
32"	—	0320B	0320C
34"	—	0340B	0340C
36"	—	0360B	0360C
42"	—	0420B	0420C
48"	—	—	0480C
60"	—	—	0600C
72"	—	—	0720C

Optional Instrument Shutoff Valves

Order Code	Description	Pressure/Temperature Rating
XX	No Instrument valves	Connections are ½" MNPT
00	Bronze gate valves, ½" FNPT x ½" FNPT	300 PSI Stream Max. @ 550ºF 600 PSI liquid @ 200ºF nonshock
02	Carbon steel block valve, ½" FNPT x ½" FNPT	6000 PSI max. @ 200ºF 4000 PSI @ 500ºF Max.
03	316SS block valve, ½" FNPT x ½" FNPT	6000 PSI max. @ 200ºF 4000 PSI @ 500ºF Max.
04	Carbon steel OS&Y valve, ½" FNPT x ½" FNPT	2000 PSI max. @ 100ºF 235 PSI @ 1000ºF Max.
05	316S OS&Y valve, ½" FNPT x ½" FNPT	1920 PSI max. @ 100ºF 550 PSI @ 1200ºF Max.
SP	As required	For temp or pres. above those listed

Insertion Valves

Order Code	½" (A) Diameter / 1" (B) Diameter	2⅜" Diameter
02	Carbon steel ball valve 1000 PSI @ 175°F Max. 75 PSI @ 400°F Max.	Carbon Steel Flanged 275 PSI Max. @ 445°F 200 PSI @ 500°F Max.
03	316SS ball valve 800 PSI Max. @ 225°F 75 PSI @ 400°F Max.	316SS flanged ball valve 275 PSI Max. @ 445°F 200 PSI @ 500°F Max.
04	Carbon steel OS&Y valve 2000 PSI Max. @ 100°F 1015 PSI @ 800°F Max.	Carbon steel OS&Y valve 285 PSI Max. @ 100°F 140 PSI @ 800°F Max.
05	316SS OS&Y valve 1600 PSI Max. @ 100°F 875 PSI @ 800°F Max.	316SS OS&Y valve 235 PSI Max. @ 100°F 140 PSI @ 800°F Max.
SP	As required. For press or temp above those listed, consult factory.	As required. For press or temp above those listed, consult factory.

Mounting Hardware and Packings

Order Code	Description
03	Carbon steel mounting hardware thredolet and rim with 316SS packing housing and Grafoil packing.
04	All 316SS mounting hardware, thredolet and trim with 316SS packing housing and Grafoil packing.
SP	For materials other than those listed, consult factory.

Series 40H thru 43H

Accutube

Series 40H / 42H Accutube - Single Mount. These accutubes have a probe constructed of a 316LSS, with a 316LSS integral 3-valve head. Both have a single-mount support and are installed through a compression fitting and thredolet (included). The 40H and 42H are designed to mount a 2⅛" center-to-center DP transmitter using O-rings. ¼" FNPT connections are also included in the design. The 42H model incorporates an integral RTD for temperature measurements. Series 40H & 42H Accutubes are available for sizes 6" through 42".

Series 41H / 43H Accutube - Double Mount. These accutubes have a probe constructed of a 316LSS, with a 316LSS integral 3-valve head. Both are double supported, and come with compression fitting, opposite side support and two thredolets. The 41H and 43H are designed to mount a 2⅛" center-to-center DP transmitter using O-rings. ¼" FNPT connections are also included in the design. The 43H model incorporates an integral RTD for temperature measurements. Series 41H & 43H Accutubes are available for sizes 6" through 72".

- High pressure / temperature insertion type flow sensor with integral 3-valve head for direct mount transmitters
- Integral RTD option with series 42H & 43H
- Gas, liquid and steam applications
- Standard sizes up to 72" pipe
- Pressure / temperature limit: 1500 PSIG max @ 800°F Max

Series 40H thru 43H

Accutube

Customizing a Meriam Accutube to fit your application couldn't be easier. Simply review the options below and create your unique part number. Contact Meriam with this information and place your order. It's that simple!

Model Number

4 __ H - __ __ __ __ __ - 0 3 - __ __ - X X - __ __

Model Code

40H - Single Mount
41H - Double Mount
42H - Single Mount w/RTD
43H - Double Mount w/RTD

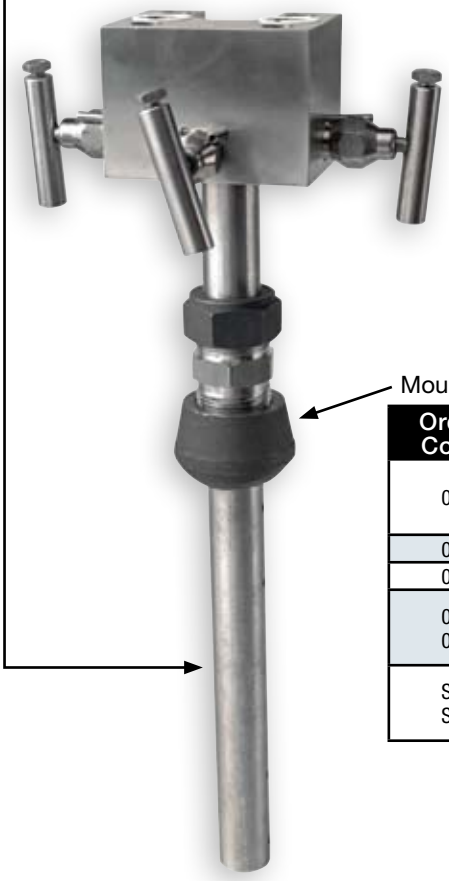
Body Material

Body Material	Order Code
316SS Head & Probe	03
For special material consult factory	SP

Line Size and Probe Diameter

	Order Code	
	40H / 42H Single	41H / 43H Double
Line Size	1" Dia. Probe	1" Dia. Probe
6"	0060B	0060B
8"	0080B	0080B
10"	0100B	0100B
12"	0120B	0120B
14"	0140B	0140B
16"	0160B	0160B
18"	0180B	0180B
20"	0200B	0200B
22"	0220B	0220B
24"	0240B	0240B
26"	0260B	0260B
28"	0280B	0280B
30"	0300B	0300B
32"	0320B	0320B
34"	0340B	0340B
36"	0360B	0360B
42"	0420B	0420B
48"	—	0480B
60"	—	0600B
72"	—	0720B

Above 72" Consult Factory



Instrument Valves

Integral 3-Valve Instrument Head		
Order Code	Description	Pressure/Temperature Rating
03	316LSS instrument valves for bolt-on transmitter	1500 PSIG @ 800°F
SP	For special material consult factory	Consult Factory

Mounting Hardware

Order Code	Packing Material	Mounting Material		Line Size
01	316SS	C.I. Saddle Clamp Steel Strap Type Steel Strap Type	SINGLE MOUNT ONLY	6" -10" 12" - 18" 20" - 30"
03	316SS	C.S. Thredolet		ALL
04	316SS	316SS Thredolet		ALL
06 07	316SS	C.S. Duct Mount 06 = Round 07 = Sq. or Rect.		6" - 24" 26" - 42"
S6 S7	316SS	S.S. Duct Mount S6 = Round S7 = Sq. or Rect.		6" - 24" 26" - 42"

Series 70H and 72H

Accutube (with RTD)

Series 70H & 72H Accutube - Wet Tap. These Wet Tap style Accutubes provide the ability to access a pipe without service interruption. The integral 3-valve manifold head enables direct mounting of any DP or Multivariable transmitter having 2⅛" center-to-center dimensions. The model 72H incorporates an integral RTD for temperature measurements. The RTD can be serviced without process shutdown or removal of the transmitter. The probe and head are constructed of 316LSS. Gear Drive or Socket Drive mechanisms are available. The 70H & 72H Accutubes are available for sizes 6" through 42". Consult factory for larger pipe diameters or optional process connections.

- High pressure / temperature wet tap flow sensor with integral 3-valve head for direct mount DP or Multivariable transmitters
- Series 70H includes Integral RTD
- Gas, liquid and steam applications
- Standard sizes up to 42" pipe
- Pressure / temperature limit: 1000 PSIG max @ 800°F Max

Series 70H and 72H

Accutube

Customizing a Meriam Accutube to fit your application couldn't be easier. Simply review the options below and create your unique part number. Contact Meriam with this information and place your order. It's that simple!

SD	Socket Drive
GD	Gear Drive

Model Number

7 __ H - __ __ __ __ __ - 0 3 - __ __ - X X - __ __ - __ __

Model Code

70H - Single Mount
72H - Double Mount

Body Material

Body Material	Order Code
316SS Head & Probe	03
For special material consult factory	SP

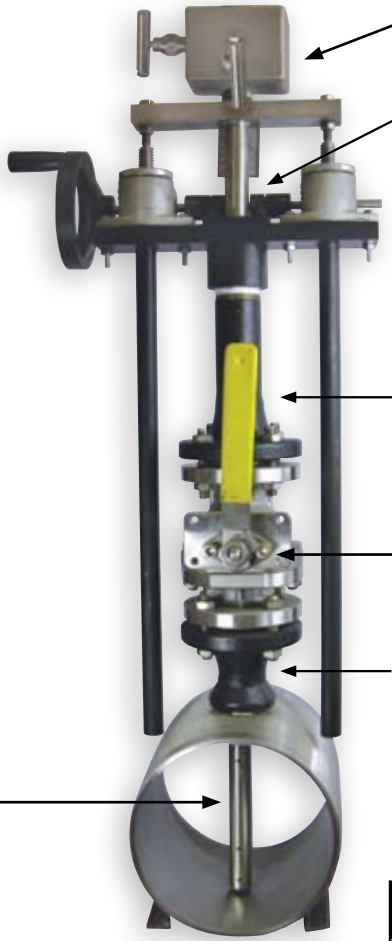
Instrument Valves

Integral 3-Valve Instrument Head

Order Code	Description	Pressure / Temperature Rating
03	316LSS instrument valves for bolt-on transmitter	1000 PSIG @ 800°F
SP	For special material consult factory	Consult Factory

Line Size and Probe Diameter

	Order Code	
	70H Single	72H Double
Line Size	1" Dia. Probe	1" Dia. Probe
6" 8" 10"	0060B 0080B 0100B	0060B 0080B 0100B
12" 14" 16"	0120B 0140B 0160B	0120B 0140B 0160B
18" 20" 22"	0180B 0200B 0220B	0180B 0200B 0220B
24" 26" 28"	0240B 0260B 0280B	0240B 0260B 0280B
30" 32" 34"	0300B 0320B 0340B	0300B 0320B 0340B
36" 42"	0360B 0420B	0360B 0420B



Insertion Valves

Order Code	Description
02	Carbon steel ball valve 1000 PSI @ 175°F Max. 75 PSI @ 400°F Max.
03	316SS ball valve 800 PSI Max. @ 225°F 75 PSI @ 400°F Max.
04	Carbon steel OS&Y valve 2000 PSI Max. @ 100°F 1015 PSI @ 800°F Max.
05	316SS OS&Y valve 1600 PSI Max. @ 100°F 875 PSI @ 800°F Max.
SP	As required. For press or temp above those listed, consult factory.

Mounting Hardware and Packings

Order Code	Description
03	Carbon steel mounting hardware thredolet and rim with 316SS packing housing and Grafoil packing.
04	All 316SS mounting hardware, thredolet and trim with 316SS packing housing and Grafoil packing.
SP	For materials other than those listed, consult factory.

Yokogawa Pressure Transmitters

on 40H Accutube

Meriam is proud to offer an integrated flow measurement system solution using our 40H series Accutube flow elements with the Yokogawa EJA or EJX series of DP and multivariable transmitters.

Yokogawa EJA Series

The EJA Series is a best-selling differential pressure transmitter which incorporates Yokogawa's high accuracy resonating pressure (HARP) silicon sensor, a field-proven technology that is intelligent and offers ultra-high performance. This transmitter's compact and light weight design has been achieved without compromising performance or service life. The digital principle of the sensor provides repeatability and stability that is superior to analog sensor designs and is virtually immune to the effects of vibration, temperature, static pressure, and overpressure events.

When used with the EJA DP transmitters, Meriam's 40H / 41H series features direct mount heads with integral 3-valve equalizing manifold that provides ultimate utility. The transmitter bolts directly onto the head eliminating the need to install pressure lines, saving installation and mounting time. They are ideal for plant upgrades, adding measurement points and for new plant installations.

Yokogawa EJX910

The high-performance EJX910 multivariable transmitter features a single-crystal silicon resonant sensor and is suitable to measure liquid, gas or steam mass flow. The EJX910 outputs a 4-20 mA DC signal corresponding to the measured differential pressure, static pressure, process temperature, or dynamically calculated and fully compensated mass flow.

Yokogawa Pressure Transmitters

on 40H Accutube

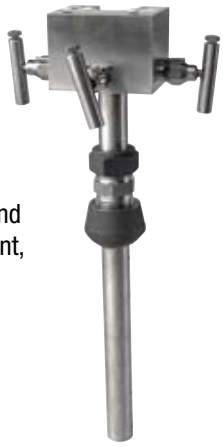
When combining the Accutube and the Yokogawa EJX910 multivariable transmitter, mass flow and corrected volumetric flow measurement applications are handled. The multivariable transmitter provides additional ease of use with features such as:

- Replaces 3 element steam and gas flow systems
- One unit does temperature, pressure, DP, and calculates flow from those parameters
- Can use one twisted pair to the control room
- Configurable with a laptop

Ordering Information

To order the Yokogawa Pressure Transmitter custom made to your specifications, please contact your Meriam sales representative with the following information:

- Pressure range
- Wetted parts
- Process connections: ¼" FNPT or ½" FNPT
- Integral LCD display: yes or no
- Approval(s) required



Companion Products

To further reduce installation time and limit pipe penetration to a single point, select Accutube models 42H or 43H with the integral RTD option.

Laminar Flow Elements

Meriam Laminar Flow Elements (LFEs) are excellent for measuring low gas flow rates from 0.2 SCCM up to 2250 SCFM. They are inherently accurate and repeatable and are calibrated traceable to NIST in our ISO 17025 certified Flow Lab. Flow turndown is 20:1 or better and the differential pressure generated is nearly linear to flow. This combination makes an LFE a great choice for gas flow measurement and flow control applications.

APPLICATIONS

LFEs are applicable in most clean and non-condensing gas flow applications. They excel in critical gas flow measurement applications and make excellent calibration standards because of their inherent accuracy, stable calibration, excellent response time and repeatability. LFEs are used to calibrate turbine meters, variable area meters, flow regulators, mass flow meters, and thermal anemometers to name a few. Gas flow measurement for demanding flow control is a common application. Other applications include leak detection and quantification, design and testing of discrete parts, automotive engine and emissions testing, and window and door leak testing.

LFEs for tapered or straight thread with O-ring process connections

Performance

Standard LFE calibration accuracy is ± 0.72% of Reading (not % of Full Scale) traceable to the National Institute of Standards and Technology (NIST). Rigid construction and lack of any moving parts make the LFE calibration stable. Only physical damage or particulate deposition in the element will cause a calibration shift.

Standard Accuracy:	± 0.72% to ± 0.86% of Reading
Repeatability:	0.1%
Response time:	16 ms
Turndown:	20:1 achievable with accurate DP device Greater turndown achievable with precision DP device

LFEs for hose type process connections

Utility

LFEs can be used to measure flow rate for a variety of gases and applications. Standard models are available to measure as little as 0.2 SCCM (5.9 E-06 SCFM) to as much as 2250 SCFM of air flow at standard conditions. Custom models for up to 15,000 SCFM of air are available. Stainless steel or aluminum materials make LFEs compatible with most gases. Flow rate of gas mixtures can also be measured when the percentages of component gases and mixture properties are known.

LFEs for straight thread VCO process connections

The LFE Matrix

The LFE matrix can be made from individual SS tubes or windings of SS foil. These tubes are long enough, relative to their inside diameter, to cause laminar flow to occur inside each tube. The result is a near linear relationship between DP and flow rate. The DP generated across the matrix responds very quickly to changes in flow. All DP is permanent pressure loss to the system but LFEs are sized to produce no greater than 8" water column at maximum flowing conditions. Individual tube diameters are very small so flowing gases need to be clean and dry to preserve the calibration. Filtered inlet versions of most LFE models are available to keep the matrix clean and the calibration constant.

LFEs for flanged process connections

Calibration and Accuracy

Meriam LFEs are calibrated with air at atmospheric conditions referenced to 29.92" mercury absolute (760mm Hg. Abs.) and 70ºF (21.1ºC). Each completed element is calibrated and traceable to the National Institute of Standards and Technology. Our Special Calibration Procedure #A-33544 is designed to meet the basic requirements of MIL-STD-45662A, ANSI Z540, 10CFR50 and MIL-Q-9858A.

Meriam LFEs are supplied with a reproducible flow curve in terms of SCFM versus inches of water differential pressure. Correction factors are included to cover an inlet pressure range from 26 to 36" Hg Abs. and an inlet temperature from 50ºF to 150ºF. For special flow applications, contact Meriam with complete flow information. The rated accuracy* of all Meriam LFEs is percentage of actual reading; not the much wider percentage of full scale flow rate tolerance of other devices.

Filtered inlet LFE's available for intake measurment applications

***Accuracy Levels Available:**

Commercial Calibration	± 0.72% of Actual Reading†
Master Calibration	± 0.64% of Actual Reading††
Independent Lab Calibration	± 0.50% of Actual Reading or better, consult factory

† ± 0.86% Reading for full scale flow of 1000 SCFM or higher
†† ± 0.70% Reading for full scale flow of 1000 SCFM or higher

LFS-1 Flow Measurement System

The LFS-1 Flow Measurement System for Meriam LFEs provides a superior gas flow measurement solution. The integral flow computer makes real time corrections for changes in differential pressure, static pressure, temperature and relative humidity to provide the most accurate results possible. All LFS packages include complete instrumentation, system calibration and NIST traceable documentation.

50MC2-T Series

- LFE for flows of 400 SCFM to 2250 SCFM
- No straight run requirements upstream of inline filter assembly
- Mechanism allows end user to change filter with virtually no effect on the calibration curve (no more than ±0.3%)

LFE

LFS-1 Flow Measurement System

The LFS-1 Flow Measurement System for Meriam LFEs takes advantage of the wide flow turndown and the percent of Reading precision of the LFE, as well as Meriam's calibration expertise, to provide a superior gas flow measurement solution. The integral flow computer makes real time corrections for changes in differential pressure, static pressure, temperature and relative humidity to provide the most accurate results possible. Calibration coefficients for up to five (5) LFEs can be stored in memory and called up for later use with a push of a button. For control or data transmission purposes, the LFS-1 Flow Measurement System has both analog and digital outputs. 4–20 mA and 0–10 volts analog output options are ideal for control and recording functions. RS-232 and RS-485 digital communications are standard.

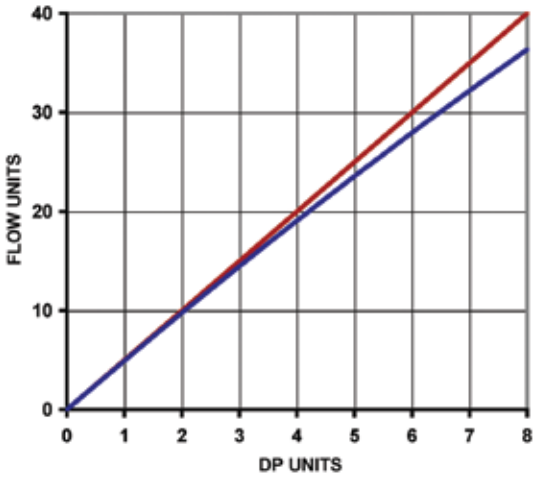
Special application requirements can often be accommodated by the LFS. For example, simultaneous flow measurement of two LFEs can be made and the summation of the two flows calculated and displayed. Or, for testing over a wide range for flow, the LFS can be set up to automatically switch from one LFE to an LFE of a different flow capacity as flow rate increases to a predetermined set point.

Meriam's LFS-1 provides standard system accuracy of ± 1.0% of Reading over a 10:1 flow turndown and ± 1.1% over 20:1 turndown. Calibration of the LFE and LFS-1 as a system makes this possible. Meriam can offer LFS accuracy as low as 0.60% of Reading over a 10:1 flow turndown by using better calibration standards. All LFS packages include complete instrumentation, system calibration and NIST traceable documentation. LFEs and systems cover gas flow ranges from 0.2 SCCM to 15,000 SCFM.

To provide the accurate answers you need in the shortest amount of time, please provide us with the following ordering data:

1. Model number.
2. Flowing gas data;
    a. Flow rate in desired units.
    b. Base conditions.
        i. Pressure
        ii. Temperature
    c. Flowing conditions
        i. Pressure
        ii. Temperature
        iii. Viscosity at flowing temperature.
    d. Differential at maximum flow.
    e. Specific gravity, if other than air.
    f. Flowing gas, if other than air.
3. Readout instrument.
4. Description of installation configuration.
5. Line size.
6. Line Material.
7. Accuracy required

Typical Laminar Flow Element DP vs. Flow Curve



KEY
Red line: Straight line for reference
Blue line: Typical LFE calibration curve

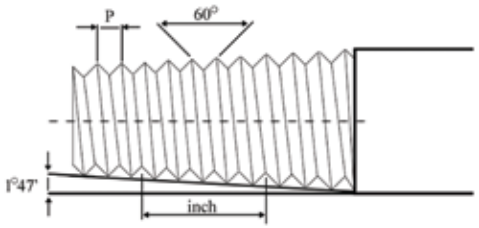
LFE

Model Number & Description		Tube Size	UNF x VCO process conn., ¼" SAE J1926 port, O-ring boss DP conn.	Nominal Air Flow Range (29.92" Hg. Abs. & 70ºF)		Max. DP In. H_2O	Nominal Air Flow Range (760 MM Hg. Abs. & 21.1ºC)			Max DP MM H_2O
				SCFM*	PPM		CC/MIN*	LPM*	Kg/M	
	50MT10 Utilizes stainless steel capillary tubes cemented into a stainless steel body. Inlet and outlet connections are VCO type. Differential pressure connections are ¼" SAE J1926 port, O-ring boss.	¼"	50MT10-8	0.00019	$1.42x10^{-5}$	4"	5.38	0.00538	$6.44x10^{-6}$	101.6
		¼"	50MT10-7	0.00062	$4.64x10^{-5}$	4"	17.5	0.0175	$2.10x10^{-5}$	101.6
		¼"	50MT10-6	0.000124	$9.28x10^{-5}$	4"	35.1	0.0351	$4.21x10^{-5}$	101.6
		¼"	50MT10-5	0.0025	$1.87x10^{-4}$	4"	70.8	0.0708	$8.48x10^{-5}$	101.6
		¼"	50MT10-4	0.0046	$3.45x10^{-4}$	4"	130	0.130	$1.56x10^{-4}$	101.6
		¼"	50MT10-3	0.0081	$6.07x10^{-4}$	4"	229	0.229	$2.75x10^{-4}$	101.6
		¼"	50MT10-2	0.0149	0.00112	4"	422	0.422	$5.06x10^{-4}$	101.6
		¼"	50MT10-1	0.046	0.00344	4"	1300	1.30	0.00156	101.6
	50MT10 All stainless steel unit with fused matrix. Inlet and outlet connections are VCO type. Differential pressure connections are ¼" SAE J1926 port, O-ring boss.	½"	50MT10-14	0.10	0.00749	8"	2830	2.83	0.00339	203.2
		½"	50MT10-13	0.18	0.0135	8"	5100	5.10	0.0061	203.2
		½"	50MT10-12	0.38	0.0285	8"	10700	10.8	0.0129	203.2
		½"	50MT10-11	0.70	0.0524	8"	19800	19.8	0.0237	203.2
		½"	50MT10-10	1.60	0.120	8"	45300	45.3	0.0543	203.2
		¾"	50MT10-9	3.00	0.225	8"	85000	85.0	0.102	203.2
	50MT20 All stainless steel unit with fused matrix. Inlet and outlet connections are VCO type. Differential pressure connections are ¼" SAE J1926 port, O-ring boss.	1"	50MT20-1	7.5	0.562	8"	$2.12x10^{5}$	212	0.254	203.2
		1½"	50MT20-1½	22	1.65	8"	$6.23x10^{5}$	6.23	0.746	203.2
		2"	50MT20-2	40	3.00	8"	$1.13x10^{6}$	1130	1.357	203.2

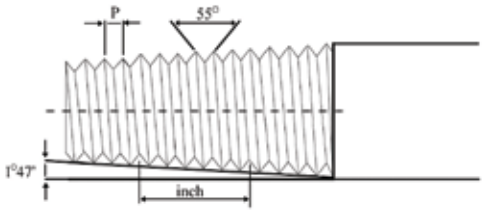
NOTES:
1. The flows and differential pressure rating of production units are subject to a variation of plus or minus 10% from the nominal values listed above.
2. Each LFE unit is calibrated with air to Meriam flow standards which are traceable to the National Bureau of Standards. Meriam calibration flow curves are furnished with each unit.
3. A special service is available for those Meriam LFE units which are governed by quality programs requiring periodic recalibration. The Special Calibration Procedure A-33544 is designed to meet the basic requirements of 10CFR50, ANSI-Z540-I & ML-Q-9858A. Contact Meriam direct for information.
4. The catalog capacities refer to the following base conditions:
   Air, 29.92" Hg Abs., 70º F, 181.87 micropoises.
   Base Reynold's Number: 300 at 8" H_2O, 150 at 4" H_2O.
5. SCFM* - Equivalent air flow at base conditions listed above.
6. All units are offered with optional integral filter on inlet side except those marked (x). Removal or replacement of filter necessitates recalibration.
7. Rated flow pressure and temperature for standard units are 30 psig and 150ºF to maintain laminar flow, calibration, linearity and accuracy. For higher pressure and temperature rating contact a Meriam Representative, or Meriam Process Technologies direct.

For sizing information, please consult Meriam's Technical / Sizing Bulletin F/N 501:215TECH or contact Meriam directly.

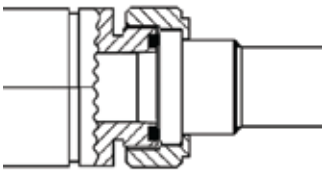
Threaded Connections Available on LFEs



NPT Pipe Connection



FISO 7/1 Pipe Connection


UNF x VCO
Tubing x VCO face seal

DIN 3852 Part 2
Tubing x straight thread / O-ring

SAE J1926
Tubing x straight thread / O-ring

Model Number & Description	Pipe Size	NPT tapered thread	FISO 7/1 tapered thread	SAE J1926 straight thread w/ O-ring	DIN3852 Part 2 straight thread w/ O-ring
 50MK10 Utilizes stainless steel capillary tubes cemented into a stainless steel body. Inlet, outlet and differential pressure connections are ¼".	¼"	50MK10-8	50MK10-8MT	50MK10-8S	50MK10-8MS
	¼"	50MK10-7	50MK10-7MT	50MK10-7S	50MK10-7MS
	¼"	50MK10-6	50MK10-6MT	50MK10-6S	50MK10-6MS
	¼"	50MK10-5	50MK10-5MT	50MK10-5S	50MK10-5MS
	¼"	50MK10-4	50MK10-4MT	50MK10-4S	50MK10-4MS
	¼"	50MK10-3	50MK10-3MT	50MK10-3S	50MK10-3MS
	¼"	50MK10-2	50MK10-2MT	50MK10-2S	50MK10-2MS
	¼"	50MK10-1	50MK10-1MT	50MK10-1S	50MK10-1MS
 Model 50MJ10 All stainless steel unit with fused matrix. Differential pressure connections are ¼". Line connections ½" NPT, except Type 9 which has ¾" NPT.	½"	50MJ10-14	50MJ10-14MT	50MJ10-14S	50MJ10-14MS
	½"	50MJ10-13	50MJ10-13MT	50MJ10-13S	50MJ10-13MS
	½"	50MJ10-12	50MJ10-12MT	50MJ10-12S	50MJ10-12MS
	½"	50MJ10-11	50MJ10-11MT	50MJ10-11S	50MJ10-11MS
	½"	50MJ10-10	50MJ10-10MT	50MJ10-10S	50MJ10-10MS
	¾"	50MJ10-9	50MJ10-9MT	50MJ10-9S	50MJ10-9MS
 50MW20 All stainless steel welded unit with fused matrix. Line connections are threaded. Differential pressure connections are ¼".	1"	50MW20-1	50MW20-1MT	50MW20-1S	50MW20-1MS
	1½"	50MW20-1 1/2	50MW20-1 1/2MT	50MW20-1 1/2S	50MW20-1 1/2MS
	2"	50MW20-2	50MW20-2MT	50MW20-2S	50MW20-2MS
 50MH10 All stainless steel welded unit with fused matrix. Line connections are tapered ends (no threads) for hose connection. Differential pressure connections are ¼" NPT.	1"	50MH10-1	-----	-----	-----
	1¼"	50MH10-1 1/4	-----	-----	-----
	1½"	50MH10-1 1/2	-----	-----	-----
	2"	50MH10-2	-----	-----	-----
	3"	50MH10-3	-----	-----	-----
	4"	50MH10-4	-----	-----	-----
	5"	50MH10-5	-----	-----	-----
	6"	50MH10-6	-----	-----	-----
	8"	50MH10-8 (x)	-----	-----	-----
	10"	50MH10-10 (x)	-----	-----	-----
	12"	50MH10-12 (x)	-----	-----	-----
	16"	50MH10-16 (x)	-----	-----	-----

NOTES:
1. The flows and differential pressure rating of production units are subject to a variation of plus or minus 10% from the nominal values listed above.
2. Each LFE unit is calibrated with air to Meriam flow standards which are traceable to the National Bureau of Standards. Meriam calibration flow curves are furnished with each unit.
3. A special service is available for those Meriam LFE units which are governed by quality programs requiring periodic recalibration. The Special Calibration Procedure A-33544 is designed to meet the basic requirements of 10CFR50, ANSI-Z540-I & ML-Q-9858A. Contact Meriam direct for information.

Nominal Air Flow Range (29.92" Hg. Abs. & 70° F)		Max. DP In. H_2O	Pipe Size	Nominal Air Flow Range (760 MM Hg. Abs. & 21.1° C)			Max DP MM H_2O
SCFM*	PPM			CC/MIN*	LPM*	Kg/M	
0.00019	1.42×10^{-5}	4"	¼"	5.38	0.00538	6.44×10^{-6}	101.6
0.00062	4.64×10^{-5}	4"	¼"	17.5	0.0175	2.10×10^{-5}	101.6
0.000124	9.28×10^{-5}	4"	¼"	35.1	0.0351	4.21×10^{-5}	101.6
0.0025	1.87×10^{-4}	4"	¼"	70.8	0.0708	8.48×10^{-5}	101.6
0.0046	3.45×10^{-4}	4"	¼"	130	0.130	1.56×10^{-4}	101.6
0.0081	6.07×10^{-4}	4"	¼"	229	.229	2.75×10^{-4}	101.6
0.0149	0.00112	4"	¼"	422	.422	5.06×10^{-4}	101.6
0.046	0.00344	4"	¼"	1300	1.30	0.00156	101.6
0.10	0.00749	8"	½"	2830	2.83	0.00339	203.2
0.18	0.0135	8"	½"	5100	5.10	0.0061	203.2
0.38	0.0285	8"	½"	10700	10.8	0.0129	203.2
0.70	0.0524	8"	½"	19800	19.8	0.0237	203.2
1.60	0.120	8"	½"	45300	45.3	0.0543	203.2
3.00	0.225	8"	¾"	85000	85.0	0.102	203.2
7.5	0.562	8"	1"	2.12×10^5	212	0.254	203.2
22	1.65	8"	1½"	6.23×10^5	623	0.746	203.2
40	3.00	8"	2"	1.13×10^6	1130	1.357	203.2
7.5	0.562	8"	1"	2.12×10^5	212	0.254	203.2
16	1.20	8"	1¼"	4.53×10^5	453	0.543	203.2
23	1.72	8"	1½"	6.51×10^5	651	.780	203.2
40	3.00	8"	2"	1.13×10^6	1130	1.35	203.2
90	6.74	8"	3"	2.55×10^6	2550	3.05	203.2
160	12.0	8"	4"	4.53×10^6	4530	5.43	203.2
250	18.7	8"	5"	7.08×10^6	7080	8.48	203.2
360	27.0	8"	6"	1.02×10^7	10200	12.2	203.2
640	47.9	8"	8"	1.81×10^7	18100	21.7	203.2
1000	74.9	8"	10"	2.83×10^7	28300	33.9	203.2
1440	108	8"	12"	4.07×10^7	40800	48.8	203.2
2250	168	8"	16"	6.37×10^7	63700	76.3	203.2

4. The catalog capacities refer to the following base conditions:
   Air, 29.92" Hg Abs., 70º F, 181.87 micropoises.
   Base Reynold's Number: 300 at 8" H_2O, 150 at 4" H_2O.
5. SCFM* - Equivalent air flow at base conditions listed above.
6. All units are offered with optional integral filter on inlet side except those marked (x). Removal or replacement of filter necessitates recalibration.
7. Rated flow pressure and temperature for standard units are 30 psig and 150ºF to maintain laminar flow, calibration, linearity and accuracy.
   For higher pressure and temperature rating contact a Meriam Representative, or Meriam Process Technologies direct.

Model Number & Description	Pipe Size	NPT tapered thread	FISO 7/1 tapered thread	SAE J1926 straight thread w/ O-ring	DIN3852 Part 2 straight thread w/ O-ring
 50MY15 All stainless steel welded unit with fused matrix. Line connections are 150 lb ANSI flanges. Differential pressure connections are ¼" NPT.	2½"	50MY15-2 1/2	-----	-----	-----
	3"	50MY15-3	-----	-----	-----
	4"	50MY15-4	-----	-----	-----
	5"	50MY15-5	-----	-----	-----
	6"	50MY15-6	-----	-----	-----
	8"	50MY15-8 (x)	-----	-----	-----
	10"	50MY15-10 (x)	-----	-----	-----
	12"	50MY15-12 (x)	-----	-----	-----
	16"	50MY15-16 (x)	-----	-----	-----
 50MR2 Aluminum housing for low pressure applications. Line connections are 150 lb ANSI flanges. Differential pressure connections ¼" hose barb.	2"	50MR2-2	-----	-----	-----
	4"	50MR2-4	-----	-----	-----
	6"	50MR2-6	-----	-----	-----
	8"	50MR2-8	-----	-----	-----
 50MC2 Aluminum housing for low pressure applications. Inlet and outlet are for hose type connections. Differential pressure connections ¼" hose barb.	2"I.D.	50MC2-2	-----	-----	-----
	4"I.D.	50MC2-4	-----	-----	-----
	6"I.D.	50MC2-6	-----	-----	-----
	8"I.D.	50MC2-8	-----	-----	-----
 50MC2-4T / 50MC2-6T / 50MC2-8T Aluminum housing featuring inline filter for low pressure applications. No straight runs required on the inlet side. Outlet designed for a pipe or hose connection. Differential pressure connections 1/4" hose barb.	4"I.D.	50MC2-4T	-----	-----	-----
	6"I.D.	50MC2-6T	-----	-----	-----
	8"I.D.	50MC2-8T	-----	-----	-----

NOTES:
1. The flows and differential pressure rating of production units are subject to a variation of plus or minus 10% from the nominal values listed above.
2. Each LFE unit is calibrated with air to Meriam flow standards which are traceable to the National Bureau of Standards. Meriam calibration flow curves are furnished with each unit.
3. A special service is available for those Meriam LFE units which are governed by quality programs requiring periodic recalibration. The Special Calibration Procedure A-33544 is designed to meet the basic requirements of 10CFR50, ANSI-Z540-I & ML-Q-9858A. Contact Meriam direct for information.

Nominal Air Flow Range (29.92" Hg. Abs. & 70° F)		Max. DP In. H_2O	Pipe Size	Nominal Air Flow Range (760 MM Hg. Abs. & 21.1° C)			Max DP MM H_2O
SCFM*	PPM			CC/MIN*	LPM*	Kg/M	
60	4.50	8"	2½"	1.69×10^6	1700	2.03	203.2
90	6.74	8"	3"	2.55×10^6	2550	3.05	203.2
160	12.0	8"	4"	4.53×10^6	4530	5.43	203.2
250	18.7	8"	5"	7.08×10^6	7080	8.48	203.2
360	27.0	8"	6"	1.02×10^7	10200	12.2	203.2
640	47.9	8"	8"	1.81×10^7	18100	21.7	203.2
1000	74.9	8"	10"	2.83×10^7	28300	33.9	203.2
1440	108	8"	12"	4.07×10^7	40800	48.8	203.2
2250	169	8"	16"	6.37×10^7	63700	76.6	203.2
100	7.49	8"	2"	2.83×10^6	2830	3.39	203.2
400	30.0	8"	4"	1.13×10^7	11300	13.6	203.2
1000	74.9	8"	6"	2.83×10^7	28300	33.9	203.2
2250	168	8"	8"	6.37×10^7	63700	76.3	203.2
100	7.49	8"	2"I.D.	2.83×10^6	2830	3.39	203.2
400	30.0	8"	4"I.D.	1.13×10^7	11300	13.6	203.2
1000	74.9	8"	6"I.D.	2.83×10^7	28300	33.9	203.2
2250	168	8"	8"I.D.	6.37×10^7	63700	76.3	203.2
400	30.0	8"	4"I.D.	1.13×10^7	11300	13.6	203.2
1000	74.9	8"	6"I.D.	2.83×10^7	28300	33.9	203.2
2250	168	8"	8"I.D.	6.37×10^7	63700	76.3	203.2

4. The catalog capacities refer to the following base conditions:
   Air, 29.92" Hg Abs., 70º F, 181.87 micropoises.
   Base Reynold's Number: 300 at 8" H_2O, 150 at 4" H_2O.
5. SCFM* - Equivalent air flow at base conditions listed above.
6. All units are offered with optional integral filter on inlet side except those marked (x). Removal or replacement of filter necessitates recalibration.
7. Rated flow pressure and temperature for standard units are 30 psig and 150ºF to maintain laminar flow, calibration, linearity and accuracy.
   For higher pressure and temperature rating contact a Meriam Representative, or Meriam Process Technologies direct.

Flow Computers

Series 1900 Flow Computer

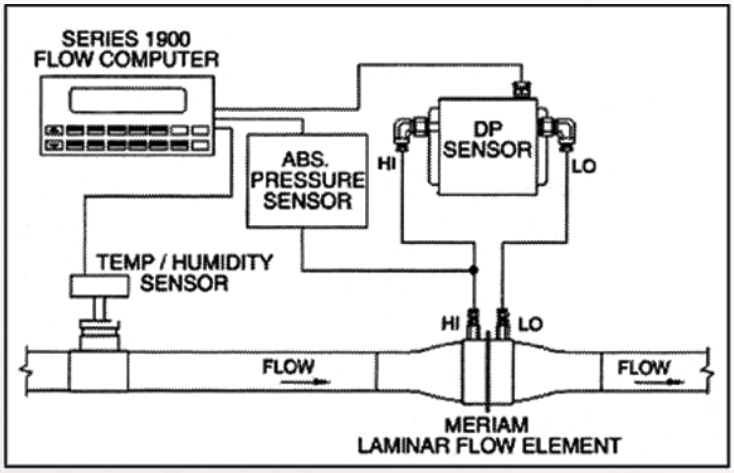
Our Series 1900 Flow Computer is a handy, all-in-one device that can be incorporated into many facets of your projects. It is perfect for a variety of flowmeter types in applications such as liquid, gas, steam and heat. Not only is it convenient, it has the ability to log data for approximately 1,000 transactions - information that can be used for uploading or printing later.

WEBINARS

Meriam is proud to offer a series of Webinars (Online Seminars) to help you master skills on our products and their applications in the industry. All of these seminars are FREE and can be "attended" from the convenience of your office! Simply log in and follow along. The sessions are typically completed within 25 to 30 minutes and include a Q & A period at the end. Contact Meriam today to learn how to sign up.

The Series 1900 Flow Computer is a versatile unit with many advanced features.

- Use with Laminar Flow Elements, Accutube® averaging pitot tubes, Orifice Plates, Venturis, Vortex, Turbines or other flow meters
- Corrects for density and viscosity changes based on pressure and temperature inputs
- Windows set up
- Calculates corrected or actual flow rate and total
- Analog, relay and digital outputs

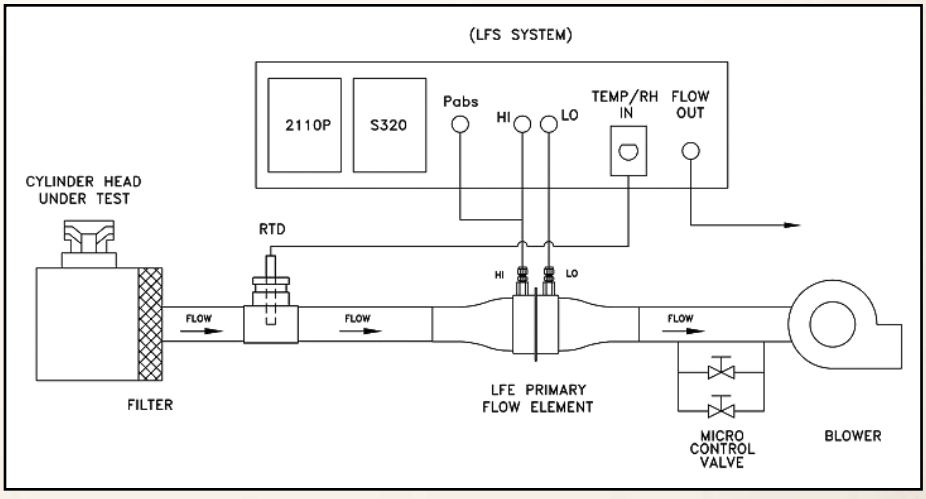


S320 Flow Computer

The modular design of the S320 (with a wide range of available analog slot cards and included digital I/O) provides the flexibility necessary to easily adapt this powerful system to your specific application. Transducer signal conditioning and power is provided by the dual channel slot cards. A broad variety of voltage, current, counter, frequency and pulse inputs and outputs may be employed. Most cards use advanced sigma delta and A/D techniques with conversions having a resolution of 12 to 24 bits for best precision.

The S320 allows you to process large amounts of data, at high speeds, without a degradation in performance… cost effectively!

- Gas flow measurement, leak detection and control
- Suitable for any flow input or primary element
- High speed 32-bit floating point digital signal processor
- Battery backed RAM, Flash ROM, real time clock
- Advanced high resolution A/D converters
- Serial interfaces for control and data exchange



This illustration is an example of a typical LFS system utilizing an LFE as well as the S320 Flow Computer from Meriam.

Series 1900 Flow Computer

The Series 1900 Flow Computer satisfies the instrument requirements for a variety of flowmeter types in liquid, gas, steam and heat applications. Multiple flow equations are available in a single instrument with many advanced features.

The Series 1900 Flow Computer is compatible with Meriam Laminar Flow Element, Orifice, Venturi and AccuTube® Averaging Pitot flowmeter types. The alphanumeric display offers measured parameters in easy to understand format. Manual access to measurements and display scrolling is supported.

The Series 1900 Flow Computer permits a wide measure of versatility within the instrument package. The various hardware inputs and outputs can be "soft" assigned to meet a variety of common application needs. The user "soft selects" the usage of each input/output while configuring the instrument. Consider the following illustrative examples:

The isolated analog output can be chosen to follow the volume flow, corrected volume flow, mass flow, temperature, pressure, or density by means of a menu selection. Most hardware features are assignable by this method.

The user can assign the standard RS-232 Serial Port for external data logging, transaction printing, or for connection to a modem for remote meter reading.

A Service or Test mode is provided to assist the user during start-up system check out by monitoring inputs and exercising outputs. The system setup can also be printed.

Serial Communication

The serial port can be used for printing, datalogging, modem connection, two way paging/and communication with a computer.

RS-232

Device ID	01-99
Baud Rates	300, 600, 1200, 2400, 4800, 9600, 19200
Parity	None, Odd, Even
Handshaking	None, Software, Hardware
Print Setup	Configurable print list and formatting

RS-485

Device ID	01-247
Baud Rates	300, 600, 1200, 2400, 4800, 9600, 19200
Parity	None, Odd, Even
Protocol	Modbus RTU (Half Duplex)

Data Logging

The data logger captures print list information to internal storage for approximately 1000 transactions. This information can be used for later uploading or printing. Storage format is selectable for Comma-Carriage Return or Printer formats.

Listing

CE Approved, UL/CSA Pending

Series 1900

Flow Computer

Flow Inputs

Analog Input:

Accuracy: 0.01% FS at 20°C
Update Rate: 4 updates/sec

Temperature, Pressure, Density / Relative Humidity Inputs

The compensation inputs usage are menu selectable for temperature, temperature 2, pressure, density/ relative humidity or not used.

Calibration: Operator assisted learn mode
Operation: Ratiometric
Basic Measurement Resolution: 16 bit
Update Rate: 2 updates/sec minimum
Automatic Fault detection:
Signal Over-range/under-range
Current Loop Broken
RTD short
RTD open
Reverse Polarity: No ill effects
Over-Current Limit (current input) Internally limited to protect input to 24 VDC

Available Input Ranges
Current: 4-20 mA, 0-20 mA
Voltage: 0-5 VDC, 0-10VDC on RH Input only
Resistance: 100 Ohms DIN RTD

100 Ohm DIN RTD (DIN 43-760, BS 1904):
Three Wire Lead Compensation
Internal RTD linearization learns ice point resistance
1 mA Excitation current with reverse polarity protection
Temperature Resolution: 0.01ºC

User Entered Stored Information (EEPROM / Nonvolatile RAM)

Transmitter Ranges, Signal Types
Fluid Properties
(specific gravity, expansion factor, specific heat, viscosity, isentropic exponent, combustion heating value, Z factor)
Units Selections (English/Metric)
Language Translations (optional)

Excitation Voltage

24 VDC @ 100 mA (fault protected)

Relay Outputs

The relay outputs usage is menu assignable to (Individually for each relay) Hi/Lo Flow Rate Alarm, Hi/ Lo Temperature Alarm, Hi/Lo Pressure Alarm, Pulse Output (pulse options), Wet Steam or General purpose warning (security).

Number of Relays	2 (3 optional)
Contact Style	Form C contacts
Contact Ratings	240V, 5 amp

Stored Information (ROM)

Steam Tables (saturated & superheated),
Fluid Properties: Water, Dry Air, Humid Air, Argon, CO_2, Ethylene, Helium, Hydrogen, Nitrogen, Oxygen, Methane, Natural Gas, Propane. Additional selections for dry or humid generic gas for general use.

Real Time Clock

The Flow Computer is equipped with a non-volatile real time clock with display of time and date.

Format: 24 hour format for time
Day, Month, Year for date

Analog Outputs

The analog outputs are menu assignable to correspond to the Uncompensated Volume Rate, Corrected Volume Rate, Mass Rate, Heat Rate, Temperature, Density, or Pressure.

Number of Outputs: 2
Type: Isolated Current Sourcing (shared common)
Available Ranges: 0-20 mA, 4-20 mA (menu selectable)
Resolution: 16 bit
Accuracy: 0.05% FS at 20ºC
Update Rate: 5 updates/sec
Temperature Drift: Less than 200 ppm/C
Maximum Load: 1000 ohms
Compliance Effect: Less than .05% Span
60 Hz rejection: 40 dB minimum
EMI: No effect at 3 V/M
Calibration: Operator assisted Learn Mode
Averaging: User entry of DSP Averaging constant to cause a smooth control action

Isolated Pulse Output

The isolated pulse output is menu assignable to Uncompensated Volume Total, Compensated Volume Total, Heat Total or Mass Total.

Pulse Output Form (menu selectable):
Open Collector NPN or 24 VDC voltage pulse
Nominal On Voltage: 24 VDC
Maximum Sink Current: 25 mA
Maximum Source Current: 25 mA
Maximum Off Voltage: 30 VDC
Saturation Voltage: 0.4 VDC
Pulse Duration: User selectable
Pulse output buffer: 8 bit
Fault Protection
Reverse polarity:
Shunt Diodes
Over-current Protected
Over-voltage Protected

Ordering Information

To order Meriam's Series 1900 Flow Computer custom-made to your specifications, please contact your Meriam sales representative with the following information:

- Display: Standard LCD or Optional Vacuum Fluorescent
- Power input: Standard Universal AC power (85 – 276 VAC) or 24 VDC
- Network Card: RS485/Modbus or none
- Optional Mounting: Panel, NEMA 4 Wall Mount, NEMA 12/13 Wall Mount with Clear Cover or Explosionproof (specify with or without buttons)
- Optional Outputs: 3-relays or datalogger

Specifications	
Environmental	Operating Temperature: 0 to +50ºC Storage Temperature: -40 to +85ºC Humidity: 0-95% Non-condensing Materials: UL, CSA, VDE approved
Display	Type: 2 lines of 20 characters Types: Backlit LCD and VFD ordering options Character Size: 0.3" nominal User selectable label descriptors and units of measure
Keypad	Keypad Type: Membrane Keypad Keypad Rating: Sealed to Nema 4 Number of keys: 16
Enclosure	Enclosure Options: Panel, Wall, Explosion Proof Size: 5.6" x 2.8" x 6.65" Depth behind panel: 6.5" including mating connector Type: DIN Materials: Plastic, UL94V-0, Flame retardant Bezel: Textured per matt finish

S320 Flow Computer

for Precise Measurement and Control

The Meriam Model S320 is a high quality industrial process flow computer designed for precise measurement and control applications. Extraordinary performance is attributable to a 32-bit floating point digital signal processor integrated into a well planned platform utilizing state-of-the-art hardware and software.

Programmed in a high level language, the S320 comes with an extensive library of standard application functions and examples. Units are configured to your specific requirements. If you choose to modify the unit, programs can be written on any PC (using included software development tools) and downloaded via a dedicated serial link. The operating system may be DOS, Windows '95, NT or OS2.

In addition to the programming link, three serial interfaces are included for control, data collection, calibration and configuration. This allows communication with other computers and S320 units. The two standard RS485 ports can communicate with many devices using a single cable. This reduces wiring costs, improves signal quality and eliminates analog signal cards where field devices have RS485 capability.

The standard software permits the use of calibration data to characterize the primary flow elements and transducers. This allows less expensive devices to be applied, while meeting your system performance objectives.

S320 Flow Computer

for Precise Measurement and Control

Applications

Flow Measurement: The S320 Flow Computer can be used with nearly all differential pressure producing primary flow elements such as orifice plates, nozzles, venturis, annular averaging pitot tubes and laminar flow elements. Devices that are essentially (but not absolutely) linear like LFE, turbine, vortex, impeller, positive displacement meters, etc. may be used with appropriate transducers. Regardless of sensor type, all flow devices will benefit from the S320's capability to characterize the flow element and transducers from test/calibration data. System and component offset and gain errors (sometimes overlooked in the data acquisition chain) are easily corrected. Non-linearity, frequently associated with the primary flow sensor, may be reduced by interpolation, spline or polynomial methods with the S320.

Compensation or correction for variations in process gas pressure, temperature and humidity will improve the accuracy of the flow calculations. The S320 equations consider the effects of measured operating condition changes on gas properties such as viscosity and density. Precise calculations are made using stored gas property data for 14 common gases. Actual, standardized volume and mass flows are calculated using ideal or real gas laws. Calculation results are displayed and available for analog of digital transmission, data collection or control.

Leak Detection: When combined with Meriam's laminar flow elements, leaks as small as 1 SCCM are easily measured. The speed and precision at which the LFE/S320 system quantifies the leak rate makes it the best choice for high volume parts testing. It is superior to pressure decay, mass meters or other flow testing techniques.

Control: The S320 is an elegant, scalable and configurable control system. Capabilities include PI or PID algorithms, 8 digital inputs and 8 digital outputs, timer/counter functions and as many as 5 analog voltage, current, frequency or pulse width modulation outputs form any of the measured or calculated perimeters. The S320 can stand alone or be easily integrated into your process control, PC or PLC system providing localized signal processing, control and digital multi-drop bus communication.

Meriam will provide primary flow elements, transducers and S320 Flow Computers as components or complete systems with standard software and services specific to your application requirements.

Signal Processing Slot Cards

(as many as 5 series 100, 200, 300 or 500 cards may be used)

Type 100 (2) analog inputs; sigma delta A/D
Type 110 (2) analog inputs; integrating A/D
Type 200 (2) analog outputs; sigma delta A/D
Type 310 (1) analog in and out; flash-converter
Type 400 digital I/O expansion bus for modules below
- Module 410 (16) digital inputs; DIN Rail mount
- Module 420 (16) digital outputs; DIN Rail mount
- Module 430 (8) each digital in/out; DIN Rail mount
- LEDIG diagnostic adapter for digital I/O with status LEDs

Type 510 (2) frequency and duty cycle inputs

Ordering Information

To order Meriam's S320 Flow Computer custom-made to your specifications, please contact your Meriam sales representative with the following information:

- Number of Analog and Digital Inputs Required
- Application type: Laminar Flow Element, Accutube Averaging Pitot Tube, Orifice plate, Flow nozzle or Leak Detection
- Number of Analog and Digital Outputs Required
- Power Supply: 2, 3, or 4 Amp

Specifications	
Basic Electronic Components	32 Bit floating point digital signal processor; Real time clock Flash ROM; Battery backed RAM 256kb RAM memory, 512kb option
Display, Keypad	Three 6 digit numeric LED Three 4 digit alphanumeric LED Three parameter function keys Two arrow keys
Power Requirements	24 volts DC, approx. 8 watts
Enclosure	DIN front panel 96x96mm (3.78" x 3.78") Depth 185mm (7.28") with connectors Cutout 92x92mm (3.62"x3.62")

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Meriam Expertise

For more than 98 years, Meriam has measured success by our high level of customer satisfaction. That's why we have grown to be one of the leading sources for Smart Instrumentation, HART Communicators, Multifunction Calibrators with HART capability and a line of mechanical instrumentation for all types of industrial applications. We combine our technical expertise with our line of products to ensure that you have the right product for all of your applications.

Putting the customer first has given us recognition as a company that is one of the most highly respected in the industry. When you choose Meriam, you get access to our technical experts, product managers and local distribution channels to give you the best in products and service.

Application Specialists On-Hand

Whether you need assistance with a mechanical flow application or a MFC software question, Meriam's experts are available to help you with a multitude of application needs. Our application specialists will work with you to determine the right products to fit your specific needs.

Custom Products – Personalized Attention

Got an unusual application where a standard product won't fit your needs? We are able to design and manufacture custom products that other manufacturers are unable to do – all with great pricing and quick turnaround times.

Dedicated Product Managers

Meriam has a dedicated team of product managers to work with you on a variety of applications. Whether you are an end user, distributor or OEM – Meriam has the knowledge and resources on all product specifics – from manufacturing, testing, and quality standards to lead times and delivery.

Right in Your Own Backyard

Meriam has distributors and reps located throughout the United States, as well as globally. Our customers benefit by having a local agent to call on and on-hand stock to meet their immediate needs. Want to see first-hand if a product meets your application needs? Meriam's distribution and rep partners have demo equipment available for customers to implement and try out in their projects.

Please visit www.meriam.com to locate the distributor or rep nearest to you.

Calibration & Repair Service

At Meriam, we hold ourselves to the highest standards of accuracy. Our calibration services provide our customers with top quality calibrations that you can trust.

If, for any reason, you need a Meriam product fixed, our repair department is your source for quick service with flat rate repair pricing that gets the unit back to you and back in service. Call our experienced customer service representatives for a RMA return number to ensure proper handling of your instrument.

Standard Warranty

Meriam's standard warranty is one (1) year from the date of shipment from the factory.

Convenient Payment Options

We offer flexibility on payment terms: 30 day net with approved credit references. For fast shipment, we accept Mastercard, Visa and American Express. To place your order, or to get a customized quote, please contact Meriam today:

Phone: 800-817-7849
Fax: 216-281-0228
E-mail: sales@meriam.com
Or use the "Information Request" link on meriam.com

Meriam Expertise

Meriam Webinars

Meriam is proud to offer a series of Webinars (Online Seminars) to help you master skills on our products and their applications in the industry. All of these seminars are FREE! Dates and times are convenient and allow you to gain important info on the products and applications without taking up a lot of your valuable time.

Recent Webinars have focused on products like Accutubes and Laminar Flow Elements. Upcoming sessions will cover new products like our M1 Series Manometers and Calibrators.

The Webinar format makes it easy for you to quickly sign on and participate in our presentation while listening to the presenter from the convenience of your office. The sessions are structured to be completed within a 25 to 30 minute timeframe including a period for Q&A at the end. Copies of the presentations will be emailed to all of those who participated after the session.

CUSTOMER TESTIMONIAL

The online webinars are a great way to gain insight on products without taking up too much time.

-MIKE M.
RECENT WEBINAR PARTICIPANT

Meriam Website

The Meriam website is continuously updated with useful information for your convenience. At www.meriam.com you can find a vast array of product-specific resources, including:

- Technical Bulletins
- Product Manuals (current & obsolete)
- Application Notes
- Datasheets
- DOF (Device Object Files) Downloads and Release Notes
- Product Information Sheets

You can also download the full line catalog, as well as current and past issues of the Meriam Standard. We also feature links to leading industry association websites, such as ISA and HART Communication Foundation.

Email Alerts

Stay in touch with all the happenings from Meriam though our e-mail alerts. These are messages loaded with application-specific or cost-saving tips conveniently delivered to your e-mail box.

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